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AMERICAN JOURNAL OF OPTOMETRY *and* ARCHIVES *of* AMERICAN ACADEMY OF OPTOMETRY

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BAUSCH & LOMB

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IN FUL-VUE

THE

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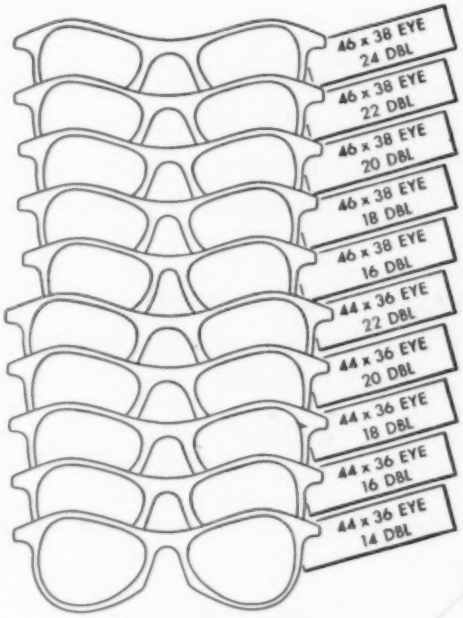

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PROFESSIONAL OPINION points to fear as one of the strongest single adversities obstructing the prescription and fitting of bifocals and trifocals.

Fear that active participation in daily work and pleasures will be curtailed, misgivings concerning the connotation of old age unfortunately applied to bifocal wearers—these are some of the known factors contributing to the indication that there is an educational job to be done.

In the current Univis Public Information Program we are effecting a kind of "Fear Prevention Campaign" in which we point out, first, that presbyopia is a condition which must be faced by *nearly everybody* approaching middle age and, second, that bifocals or trifocals are a positive *aid* . . . not a detriment . . . to the active person.

The pages of Time, Newsweek and Hygeia will be used. The advertisements, the first of which appears in reduction at the right, will be designed both to attract attention by their provocative nature and to inform the reader in a style which is simple and straight-forward. The name, Univis, appears only in the signature at the bottom of the right-hand column.

It is our purpose, as always, to display messages of educational value to the public for the greatest benefit to the reader, to the members of the professions as well as to Univis, the manufacturer.

The Univis Lens Company
Dayton 1, Ohio

Can you count the Presbyopes in this picture ?

IT'S REALLY A LOT SIMPLER than it sounds. Right now there are probably five. In ten years, three more. By 1986, there may be three more. In other words, *everyone* in the picture is or probably will be a presbyope.

What is a presbyope? Simply, it's a person whose eyes need help in focusing for close seeing. The possibility of being one is something we all face as we near the ages of 35-45.

Should it be feared? Emphatically no. Whenever so great a majority are affected, scientific study and research are always stimulated . . . often with miraculous results. The development of bifocal and trifocal lenses is that sort of miracle.

Today, with the aid of multifocal lenses, thousands are seeing as well as ever—*better* in cases where misgivings or fear of making the change caused presbyopes to miss for a time the zest for living that comes only with vision that is normal in every respect.

So when your Ophthalmologist or Optometrist prescribes bifocals or trifocals for you, wear them with confidence in his knowledge of your eyes, in the skill of the Dispensing Optician and in the ability of the manufacturer.

Perhaps, when you first put them on, your eyes may need a day or two to become accustomed to the vast improvement. But after this short period, you won't even know you're wearing them—except when you come to the full realization that the blessing of normal sight has been preserved for you in all its versatility.

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cynosure of all eyes

Century Oxford is proud to present Ful-Vue *Cynosure*—first outstanding frame creation developed by Century technicians in their new, modern research-design laboratories. Just one of many unique eyewear contributions being added to Century Oxford's renowned and varied line. *Cynosure* is confident of wide acclaim—because Ful-Vue *Cynosure* is high-styled to meet the 1947 demand and hand-polished to a rich luster. Strikingly distinctive on both men and women. Simple to adjust, permanently aligned, optically authentic. Orders now accepted. Specify *Cynosure*.

cynosure of all eyes

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The 8th Year

A-C

The Crossley—pierced, engraved bridge

1939 40 41 42 43 44 45 46 & in 1947, still

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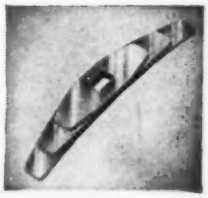
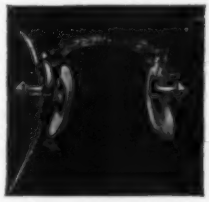
STRENGTH No-Scru Tri-Flex construction holds lenses permanently, cushions shock. Since endpieces are not attached to the lenses, two frequent lens breakage points are eliminated.

No-Scru Pin & Tube



Tri-Flex Spring

BEAUTY Distinctive design in bridges plus "invisibility" of endpieces give inconspicuous appearance of eyeglass with practical features of spectacle mounting. Blends with facial contours.



Crossley Bridge

Winslow Bridge

Permanent Alignment

Tri-Flex springs maintain lens adjustment permanently, give flexibility but positively prevent looseness. Adjustment is facilitated, ending time-consuming fitting annoyances and problems.

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NO, FIVE!

After reading with interest the advertisements of the Soft-Lite Lens Company, we've decided that there are five components in the ophthalmic prescription. It is true, of course, that spheres, prisms, cylinders, and Soft-Lite's neutral light absorption are the four basic prescription components, but with all due respect to Soft-Lite, we submit a fifth.

The 5th prescription component is the prescription laboratory. And if you'd like to make sure that 5th prescription component is working at its best for you, put your prescriptions in the hands of our capable technicians. You can always depend on expert efficiency and the use of finest quality ophthalmic materials.

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Vol. 24 FEBRUARY, 1947 No. 2

COMMEMORATING THE TWENTIETH ANNIVERSARY OF THE DISTINGUISHED SERVICE FOUNDATION OF OPTOMETRY*

Laurence P. Folsom†
South Royalton, Vermont

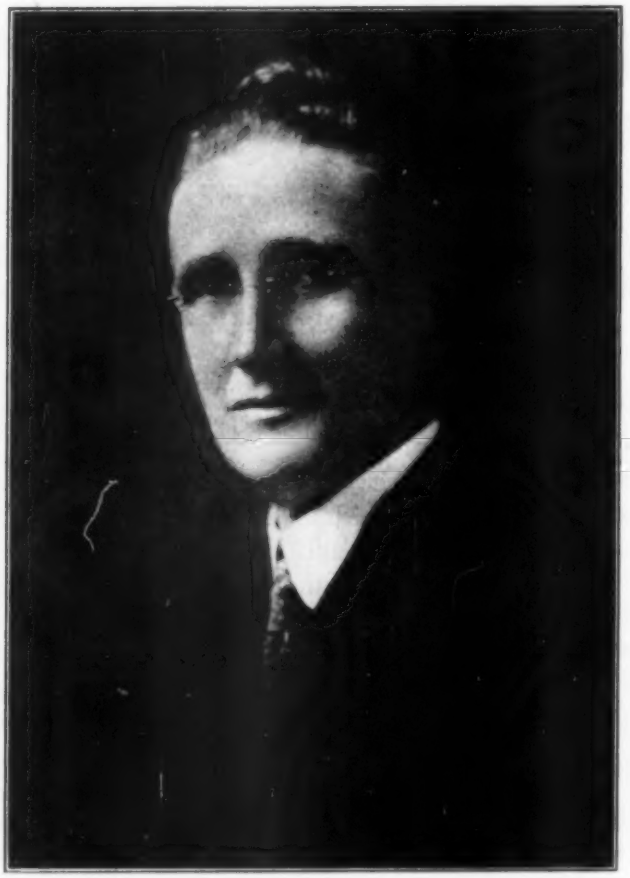
"Men of great genius and large heart sow the seeds of a new degree of progress in the world," wrote Mazzini. Such a man was Dr. George S. Houghton who, twenty years ago, established in Boston the Distinguished Service Foundation of Optometry. In announcing the formation of the Foundation in 1927, Dr. Houghton stated, "The primary purpose is to encourage research work among the thousands of optometrists throughout the country and to award with medals and fellowships the best inventive and research work in the field of human vision."

During the twenty years following its inception, the Foundation has awarded 22 medals and 192 fellowships. These awards were granted for meritorious work in research and for constructive educational activities in the field of optometry. The awards have not been made annually, but as occasion has warranted.

It has been the custom of the Foundation to make such awards in the field of any science which has contributed toward the conservation of human vision. The purpose of the Foundation has thus necessitated cooperation with other institutions and organizations so that the results of any research of value to optometry might be assembled, coordinated and presented with maximum effectiveness.

As the available knowledge in any field of human endeavor grows, it becomes such a body of data that it is necessary to sift that of greatest value and allow the remainder to pass aside. Toward that goal the Foundation has published "The Annals" which contain condensed reviews of much of the material presented by numerous contributing workers.

*Prepared at the request of the editor.
†Optometrist. Secretary-treasurer, the Distinguished Service Foundation of Optometry. Fellow, American Academy of Optometry.



Dr. George Stevens Houghton
1867 - 1933

One issue was published in 1932, a second in 1935 and a third in 1937. Due to problems of recent years no late issues have appeared.

Three works have been considered of sufficient value to merit full publication in book form. These are, "Visual Fields" by Dr. Theodore A. Brombach, published in 1936; "The Mathematics of Ophthalmic Optics" by Dr. Paul Boeder in 1937 and "The Diagnosis and Elimination of Visual Handicaps Preventing Efficient Reading," by Dr. George A. Parkins in 1941. In addition, the Foundation published in 1940 "Essentials of Visual Efficiency," a manual for teachers and public school authorities. A few copies of the Brombach and Parkins works are still available.

To direct the thinking of optometry along fundamental lines; to keep our minds established upon basic precepts and to steer clear of entangling and often misleading theories, the Foundation in 1935 announced a program of awards on work in the basic sciences upon which optometry is established. The award for the work on Mathematics has already been made. The offer of a Gold Medal and $500 in cash for the best manuscript on Physics has as yet had no takers. Now that scientists may turn their minds from destruction to construction it is hoped the desired work will be forthcoming.

Today men are thinking in terms of "public relations." Our organizations have considered, and in some instances have engaged, the expensive services of public relations counsels. We are reminded of the pithy remark of a former newspaper friend when he said, "If people would spend part of that money making news the papers would be glad to publish it without charge."

It has been the experience of the Foundation that the best paid press-release expert can barely hope to obtain more than brief mention of any optometric gathering in the public press. But whenever exercises of the Foundation have been held to award medals, the press photographers have attended and stories with illustrations have been carried effectively. Scientific progress in any field of endeavor is news. The coupling of optometry with scientific progress in the minds of the people is certainly not harmful.

But the Foundation does not favor publicity for its sake alone. No award is made upon any other basis than a sincere contribution to the cause of human seeing. The Foundation is not endowed with any income-producing funds and lacks the means to carry on effectively. It would seem that optometry might well lend a portion of its efforts to the promotion and support of an organization which not only makes favorable contacts with the press and with other fields of scientific endeavor, but which has also served to encourage men to think, reason and grow in their own chosen field of human service.

Those readers who knew Dr. Houghton will recall his firm adherence to principle. He gave freely of his strength to his profession and graduated from this life in 1933. The following year, the directorship of the Foundation was placed upon the able shoulders of Dr. Clinton R. Padelford of Fall River, Mass. With the passing of the original secretary, Mr. R. T. Elmes, in 1935, secretarial services have been performed by the writer.

WHAT KIND OF EDUCATION?*

Katherine Chamberlain†
Detroit, Michigan

So much has been written about educating the young it could easily be argued that there is no need for more on the same subject and perhaps this is so. Most of it, however, has been directed at either the parents or teachers, with the implication that you students are more or less helpless recipients of what is thrust upon you. In elementary education this is doubtless true but as a student gains in maturity he should become more and more the master of his own fate. You need to recognize that all of those who excel in any field are very largely self taught and even that much larger, relatively uninspired group that does a large proportion of the world's intellectual work without any expectation of ever becoming famous, simply regard their formal educations as convenient jumping off places from which to start on their own initiative. It has been my privilege for a good many years to study the trials, tribulations, hopes and aspirations of college students at close range and I venture to speak in the hope that something has come out of those studies that will be value to you students.

You are a very appealing group when you enter college. I have found that you come with great hopes and aspirations and, generally, with a tremendous wish to make something of yourselves. You usually show a very great willingness to do as you are told. All too often, as you go on through your courses, you seem to develop a somewhat combative spirit, a tendency to act as if none of your elders could tell you anything and as if you intended, therefore, to find out everything for yourself. Since life is short and time is fleeting, your elders, who have your interest deeply at heart, regret that you so often show such determination to learn by the hard route, namely, by making your own mistakes rather than by profiting by the experience of others. We remember your docility as freshmen and wonder with some anxiety whether we

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*This manuscript was awarded a silver medal by the Distinguished Service Foundation of Optometry in 1937. An abridgment of this heretofore unpublished paper is now presented. Submitted on December 6, 1946, for publication in the February, 1947, issue of the AMERICAN JOURNAL OF OPTOMETRY AND ARCHIVES OF AMERICAN ACADEMY OF OPTOMETRY by Dr. Laurence P. Folsom, Secretary, Distinguished Service Foundation of Optometry, who says—"while the material is directed at college students it contains much of value to all students and practitioners regardless of age."

†Associate Professor of Physics, Wayne University.

have failed you that you so often seem to lose faith in us and to adopt an attitude that is rather more suggestive of armed neutrality than of sympathetic cooperation. It is a very sad thing that so many of you become disappointed and disillusioned over college and it is my purpose here to examine some of the reasons for this and to point out, if I may, what students can do in order to profit more from the opportunities presented to them.

You have usually come from a high school. There, you have probably taken your instruction in classes containing considerable numbers who are not at all studiously inclined. Probably you have never taken your studies especially seriously, for the average high school student is quite immature and is well satisfied if he can "get by." Unfortunately, the present tendency to keep everyone in school as long as possible provides so many candidates for the lower ratings in a class that the competition sufferers and all too often a high school student is considered satisfactory for an amount of scholastic attainment that is woefully lacking both in quality and in quantity.

Then you go on to college, leaving behind you in the store or factory a part of the less fortunate crowd that made your high school days so free from any particular academic responsibility. You often find that your college teachers assign work as if they were quite unaware where the high schools had left you and you have an uneasy feeling that the academic gulf between where you were and where you are may be too difficult to cross. The standard is much higher. The college entrance requirements attend to that, for those who adorned the bottom of the class in large numbers in high school, thus providing a safe and respectable refuge for the comparatively unindustrious in the middle brackets, are no longer with you. As a result, the competition has been stepped up enormously and many a student who has heretofore had little difficulty in getting B's finds himself hanging precariously on the D level.

The difference between a good and a poor student is largely a difference in the quality of the thinking done. The poor student regards his mind as a sort of dumping ground for miscellaneous information and while he may accumulate much, he does so little organizing that his mind remains a sort of intellectual junk yard. The good student reflects upon what he learns, works it over, studies its implications, tries to do something with it. We have all known students who study comparatively little and yet seem to be able to weather the examination crisis remarkably well. We have known others who study endlessly without ever rising above the dead level of mediocrity. We say that the first class

have good minds and the others have not. Undoubtedly the individual differences in native talent are considerable, but it is my firm conviction that the second type could improve the quality of their intellectual accomplishments enormously if they would accumulate less by the method of mere fact gathering and reflect a great deal more upon the meaning of it.

As an example of possible differences in the quality of thinking, let us imagine that several people decide to make a study of the sit-down strike. The first carefully tabulates the time and place of every such incident that has occurred. There is little value in this. Another might collect in addition the circumstances of each. That is still mere accumulation and it might even be argued that it is an accumulation of material that is irrelevant. The important issues are not when, where and how these strikes have occurred but what are their social implications and what should their legal status be? Is a sit-down strike a proper weapon to legalize to improve the bargaining position of labor in its struggle with capital? Or, is it a dangerous and anti-social device that makes it possible for a minority to force its will upon the majority? Is it desirable to have workmen stay in the factories and guard the machines against sabotage or removal until grievances have been heard, or is it taking forcible possession of other men's property with definitely communistic implications? Probably no one knows exactly, but I think that it will be evident that there is an enormous difference in the quality of the thinking that must be done and in the value of the results if the problem is to be approached in these different ways. Any painstaking and methodical person could hunt through the news files and make a tabulation of where, when and how without having it contribute much either to the subject or to his own personal development, but one who is going to give a really adequate answer to the questions regarding the social implications of sit-down strikes must be far more than a mere accumulator of information. He must be able to reason clearly and without prejudice, he needs a very extensive background that most properly extends a long way back into the past, and he needs a capacity to grasp some extremely subtle values that the man on the street would say do not exist. If you believe that all of this is easy, ask a dozen people what they think of sit-down strikes and it will be surprising if you get a single answer that is not strongly colored by the temperamental bias, social background and self-interest of the person giving it.

No one would deny that one of the main purposes of education is to help people to see as deeply into the meaning of things as possible but

there are great differences of opinion about how this may be best accomplished. It is my own conviction that the social sciences are so complex that they are of doubtful value in giving students the preliminary training they need in the basic processes of reasoning. They expose a student too much to the temptation to memorize other people's theories, to form half-baked opinions on highly controversial subjects, and to regard the vociferous expression of these as evidence of thought. Granting that an intelligent interest in social problems is one of the most important elements in the mental make-up of the electorate in a democracy, it seems to me very doubtful whether we are not mistaking the end for the means when we introduce so much required work in the social sciences in the high school and early college years. As fast as more of this comes into the curriculum, an equivalent amount of other things must go out and one cannot help wondering whether a glib and superficial acquaintance with the principles of economics has not cost too much when it is gained at the sacrifice, possibly, of further training in English by those who write their mother tongue so badly that their literary output is a torment to read.

In general, we can recognize two opposing theories of education. It is difficult, if not impossible, to define them absolutely, for both are capable of an almost indefinite amount of variation, but at least we can see what the general trends are. The adherents of the so-called modern or progressive theory are very skeptical about the value of formal discipline. They are very much concerned with the idea that you students should be taught today what you are going to need to know tomorrow. They wish to inform you concerning a great variety of things and quite obviously, if this information can be made as simple and direct as possible and if it can be relieved of all extraneous matter, a very large amount of it can be presented and absorbed with relatively little effort and with even less general discipline. Much is said about preparing you for life and enabling you to fit into the social group; highly laudable purposes, certainly, but such that the extent of their realization can be measured by faith alone, a very unreliable measuring stick. Another difficulty about giving you the specific training that you are going to need is that teachers are neither sufficiently omniscient nor sufficiently endowed with the power of prophesy to be able to decide what you are going to need to know. The result of the attempt, however, is that both you and your teachers are tempted to adopt a rather superficial, utilitarian outlook, such, for instance, as would cause a prospective clerk in a grocery store to be quite unwilling to study poetry and those teaching

him to stress purely commercial subjects to an extent that is very hard both on the clerk and on the grocery.

The adherents of the opposing theory accept frankly the general premise that there is no possible means of predicting precisely what you are going to need to know. There is also good reason to suppose that the power of the human mind to forget is so phenomenal that it can be practically guaranteed that you will eventually forget a large proportion of the facts submitted to you in the name of education. It follows, therefore, that your education should train your mind so well that you will wish to keep on studying as long as you live and it is devoutly to be hoped for your entire life that the rate at which you continue to acquire knowledge is greater than the rate at which you lose it. Adherents of this theory of education are firm believers in the value of formal discipline and believe that very profitable training for the mind can be obtained by the study of some things that can be almost guaranteed to have no practical appliances whatsoever. In general, they believe that the value of a study consists not so much in what is learned as in the method of learning it and that something that compels you to reason clearly and think hard improves the quality of your mental processes as they can never be improved by easily assimilated material, particularly if it is only memorized without thinking it through. They also believe that this kind of education will give you a standard of values of a very superior order by which to appraise things. You are not likely to follow the logical ramifications of any subject far without making contact with some of the great thinkers of the world through their works and from this should come a comprehension of the greatness of man and a faith in his destiny that should help to carry you without bitterness or rebellion through the disappointments we all have to meet occasionally from unhappy personal encounters with lesser people. Last, this kind of training should endow you with a liberal supply of intellectual curiosity. Any one who is capabe of it enjoys reasoning more than memorizing. Merely accumulating something that another knows is often tiresome, but when you reason a thing out as you go you have a sense of creative accomplishment that drives you on and leaves you with a certain respect for yourself that is very gratifying and very wholesome.

A great deal of material of very questionable value has been written to the effect that there is no transfer of training and this has been taken as sufficient justification for substituting the so-called practical subjects for others that those who have been educated in the old tradition consider of more enduring worth. A great many experiments have been

carried out to discover whether training in one subject assists one to gain proficiency in another. Psychologists disagree regarding the meaning of the results but certain of these experiments have been given prominence far out of proportion to their actual worth by those who wish to prove that there is little of value in formal discipline and to justify the more informational type of subject.

I recall one that tested the transfer of training resulting from the study of Latin and concluded that none exists. It may be suspected that the Latin taught these students was tempered too much by the first point of view that a subject should inform rather than discipline the mind. There is no reason to suppose that a large amount of memorizing of Latin vocabularies would assist particularly with the dates of history any more than that the multiplication tables would contribute to the conjugation of irregular French verbs. But, if the Latin had concerned itself with the logic underlying syntax and had demanded of the students accurate translations and respectable prose, there is good reason to believe that the students would have gained something in general clarity of thinking that would not have disappeared the instant they left the Latin class. If, in addition, the instruction had given them some understanding of the position of Rome in the development of the modern world, the study could easily have helped greatly in establishing values that would have remained with them long after they had reached that state of forgetfulness that made them uncertain whether it was Caesar or Virgil who crossed the Rubicon.

Probably some of you have had your high school training in the so-called experimental or progressive schools. If so, you have been the recipient of experimental teaching that made very special and, perhaps, quite extraordinary attempts to "prepare you for life in the modern world." Whether or not this has been accomplished can scarcely be demonstrated until you have been out in the world for many years, but it may be surmised that the life for which you have been prepared is that of a man of action rather than that of a man of thought. Perhaps you have been subjected to the gentle tutelage of those who feel that none should be allowed to experience the pangs of failure for fear of developing an inferiority complex. It may be suspected that the most obvious way of insuring this is by placing the standard at a very low level with the consequent risk that really medicocre people will be allowed to feel extremely complacent over their own attainments. Perhaps your initiative has been regarded as of such importance that you have been allowed to assume the responsibilities of leadership without

ever having served a wholesome apprenticeship as a well-disciplined follower.

Doubtless there is much of value in part of such educational enterprises and skepticism regarding a portion should not be interpreted as a wholesale condemnation of the whole. But, you will do well to realize, if you have come out of schools that put a great deal of emphasis upon "adapting the course to the individual," that you may not be quite as much in sympathy as the higher education demands with the converse, adapting the individual to the course. In the realm of elementary and secondary education, results can rarely be tested in a comprehensive way and a diploma may be granted for nearly anything.

But you students in college are expecting to be trained to go out into the world some day as competent lawyers, doctors, or specialists in some other field. And even though your training is the purely cultural one of the liberal arts college, those interested in your welfare are entitled to demand that you show tangible evidence of intellectual maturity and competence superior to that possessed by those who have not had your opporunities. These results cannot be attained except by a thorough and rigorous course of training on a level far above that of a high school. You do well, therefore, as college freshmen to give a great deal of thought to adapting yourselves to the course of study and are probably wise not to worry too much over whether the course is adapted to you. Let your elders worry over that. They are really doing a great deal of it today but the results of their anxieties are quite as likely to make the courses harder as easier, so you may as well take things as you find them and be thankful.

But, even if you do find that you are not as well prepared for college as you could wish, regret over faulty training or neglected opportunities is futile. Your problem now is not what should have been done but, rather, what you should do to enable you to make the most possible out of your college course. First, it seems to me, you need to face fairly the problem of deciding which kind of education you want to make your own and which theory of education best fits your needs. Are you content to be primarily an accumulator of what other people know or have you the stamina to want to strike out for yourself and make of your studies something to which you are contributor as well as recipient? You have only to look at Rodin's Thinker to be convinced that thought has always been a painful process, at least in the early stages of the evolution of the race or the individual, and if you have never disciplined your mind much, you are going to need both courage

and strength of character to begin it now.

Next, what kind of courses are going to give you the help you need? Everyone recognizes vaguely that there are differences in the quality of the thought processes required by different subjects or by different ways of presenting them. The pity of it is that many students rate mere information too high and give no thought whatever to the value of the process by which it has been gained. Otherwise, there would be no temptation to resort to the use of old note books, for instance, cribbing or all the other forms of petty fraud that students can devise in order to delude teachers.

Suppose we stop for a moment and attempt to discover what the essential elements are in a typical thought process. We may say, to begin with, that the important parts are usually surrounded on all sides by irrelevant details that have nothing to do with the case in hand. We must first select those that are significant and reject the rest. Next, we must arrange and classify these to show their logical connection and we must evaluate each. We must study their implications and finally draw conclusions that are as free from prejudice and other forms of muddle-headedness as it is possible for us to make them.

I have already said that I feel that the problems involved in selecting, classifying and evaluating the relevant material in the social sciences are so difficut that it is proper material for the highly trained mature student rather than for the one who is getting trained. Consider, again, the problems presented by the sit-down strike. Elihu Root could doubtless have solved them wisely and well but I am sure, if you appreciate them at all, that the suggestion that you solve them could cause you to feel rather like the poor colored man who was asked if he could change ten dollars. He shook his head, and said, "No, boss, but I thanks you for the compliment."

Now, I am going to present to you what may seem like a very startling piece of heresy. The easy subjects that provide us with training in precise reasoning are mathematics and its close relatives, the physical sciences. When I say that they offer you the simplest, most easily assimilated material we have for training in precise reasoning, I hope you will not feel that I do not appreciate them and that I fail to realize what they may become to Newton or Einstein. I also appreciate the mental agony that the less exalted forms often cause students but I firmly believe that if you will accept the premise that the major purpose of your education is to develop your reasoning power and will accept the challenge to think things through and not succumb for an instant to the

temptation to memorize what you only partly comprehend for the sake of keeping peace in the classroom, that mathematics offers you one of the finest opportunities in the whole curriculum to develop your power of independent thought.

You all know the old saying to the effect that the ideal teaching situation exists when an inspiring teacher sits on one end of a log and on the other end sits a student who is capable of being taught. If I may be permitted to assume for a moment that I am such a teacher and that you are on the other end of that log, I would first find out precisely where the boundaries of your mathematical knowledge lie and then I would try to administer more to you of such difficulty that you would just be able to do it by making strenuous efforts and working to the limit of your ability. I would try to give it a content that would be rather more than mere process work and would make you think. I should want you to feel well pleased with yourself when you succeeded so that you would want more and by gradually increasing the difficulty of the reasoning out problems that you would have thought utterly beyond you when you began.

In the following pages, it is my purpose to consider a few selected topics in mathematics in the effort to show how they might be handled in order to help you to see the difference between actual thinking and the mere accumulation of other people's thoughts. These are not to be regarded as a complete course of study or an effort to write a text book. In each topic considered, I shall try to submit a set of problems or questions of gradually increasing difficulty in the effort to help you to see how much more should be involved in any lesson than merely absorbing some other person's ideas.

In fact, I am inclined to think that you will find it most profitable to select for study those topics in the following pages that you have already been taught. By giving your attention to these, it will be more possible to concentrate upon the thought processes involved and, perhaps, to distinguish more clearly between a method of study that requires you merely to accumulate information and one that also demands constructive thought.

REFLECTION OF LIGHT BY PLANE MIRRORS

This subject is always an interesting one to discuss with students because such mirrors are necessarily objects of common observation to everyone. Actually, however, most people have very erroneous ideas of

the images they form so they become a particularly good subject to indicate how inaccurately most people observe the things about them.

We shall start by assuming the following laws regarding the reflection of light.

(1) In the case of reflection by a plane surface, the angle of incidence is equal to the angle of reflection and both lie in the same plane.

(2) The line joining the object and its image is perpendicular to the plane of the mirror and the image lies as far behind the mirror as the object lies in front.

A simple experiment (Figure 1) makes it possible to locate an image in such a mirror and to verify these laws at least within the limits of accuracy set by the measurements made.

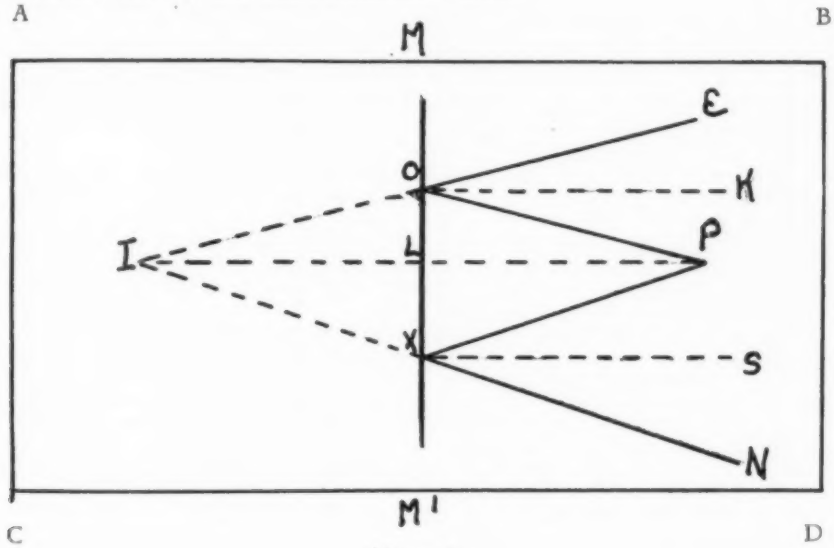

Figure 1

Let MM' be a plane mirror whose reflecting surface is perpendicular to the surface of a sheet of paper, ABCD. P is a pin stuck in the paper in a vertical position to serve as an object. I, the image of the pin is to be located. In order to do so, we take any convenient position that makes it possible to sight along a ruler at the image of the pin. We do this as accurately as possible and draw a line to indicate the position of the ruler. Somewhere along this line produced is the image of the pin but we cannot say exactly where it lies. We therefore take another position, sight along the ruler at the image of the pin and locate another line of direction toward it. Now, we mark the position of the reflecting surface of the mirror carefully and remove the mirror.

EO and NX are the lines of direction drawn toward the image of the pin. As both contain the image of the pin, it must be at the only point they have in common, their intersection, I. Draw the normals to the surface of the mirror, OK and XS and also a line from the object, P, to the image I. Then, by direct measurement show that IL, the distance from the image to the mirror is equal to LP, the distance from the mirror to the object and that the line IP joining image and object is perpendicular to the mirror.

The apparent paths of the light are IXN when the observer has his eye at N and IOE when he has his eye at E. The actual path of the light, however, is POE and PXN in the two cases for the light, of course, does not actually come from behind the mirror but, rather, from the object to the mirror where it is reflected to the eye of the observer.

TEST EXERCISES ON PLANE MIRRORS

1. Suppose that you face a plane mirror and walk backward from it. Does your image grow larger or smaller or does it remain the same size? Explain fully.
2. Can you take a photograph of yourself in a plane mirror?
3. If you were taking such a photograph of yourself while standing five feet from the mirror with the camera in your hands, at what point should you set the focussing scale on the camera?
4. Make a drawing to show the location of the image of a person standing before a mirror that is inclined toward him at an angle of forty-five degrees.
5. Do the same if the mirror is inclined away from him at an angle of one hundred thirty-five degrees with the horizontal.
6. Restaurants occasionally have mirrors mounted on the opposite walls.
   (a) If the mirrors are absolutely parallel and you sit between them, how many images of yourself can you see?
   (b) Usually they are not quite parallel. Then, how many images can you see?
7. What is the minimum length of a mirror in which you can just see yourself full length and where should it be placed?

ANSWERS TO TEST EXERCISES ON PLANE MIRRORS

1. As you walk back from a plane mirror, your image in the mirror actually remains the same size as is shown by the accompanying diagrams. (Fig. 2.)

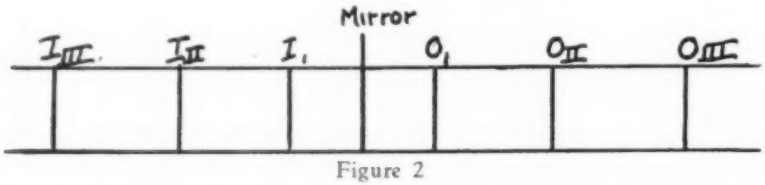

Figure 2

By the reflection laws, the line joining the top of your head to the image of the top of your head is perpendicular to the mirror and the same thing is true for the line representing your feet and the image of your feet. Whether you are near the mirror or far away will not change the image size as the separation of these two lines remains equal to your height and is therefore constant. Probably the reason that many people believe that their reflected image gets smaller in a mirror is because the image formed on the retina of their eyes does get smaller as the reflected image recedes farther and farther from them.

2. There is no reason why one cannot take his own photograph in a mirror but he should remember that the light is actually traveling from him to the mirror and back to the camera lens and not from the image.

3. The focussing scale would need to be set at ten feet rather than five as the light is traveling ten feet rather than five, from the object to the mirror and back to the camera. The image actually is ten feet distant as it is five feet from the mirror on the other side.

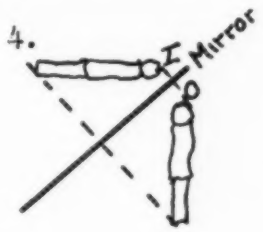

Figure 3

Question 4 and 5.

We can locate the image of a person by dropping perpendiculars upon the mirror from the extremities of the line representing him. These are produced as far behind the mirror as the points are in front and the image is indicated by connecting these points. (Fig. 3 and 4.)

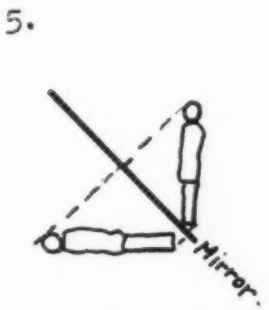

Figure 4

6. If you sit between two absolutely parallel mirrors, you will be able to see one image and only one in each mirror. The multiple images that would ordinarily exist because of repeated reflections are not found because you intercept the light. If, however, the mirrors are inclined a little, as is usually the case, many images may be seen going either up hill or down hill according to the way the mirrors are inclined. The number is not infinite because each reflection falls off in brightness and finally they are no longer bright enough so that they can be seen. (Fig. 5.)

Case (a)

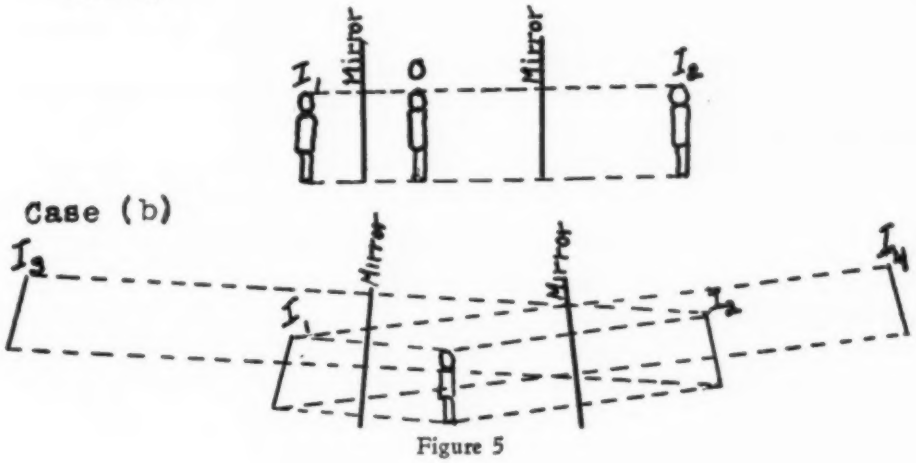

Figure 5

7. The minimum perpendicular mirror in which you can just see yourself full length has a length equal to half your height. It must be placed so that the top edge is opposite that point on your forehead that is half way between the top of your head and the pupils of your eyes. (Fig. 6.)

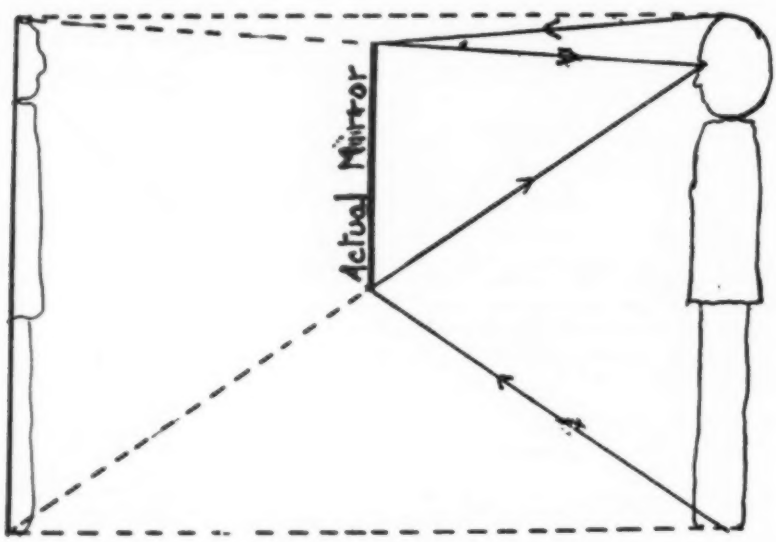

Figure 6

EXPONENTS

Exponents frequently cause students a great deal of trouble so we shall next consider these. While the variety of their forms sometimes seems to students fearful and wonderful to behold, they are all actually based upon a very few fundamental principles.

First, we need to consider the law of exponents in multiplication and division.

$a^3 \times a^2 = a \times a \times a \times a \times a = a^{3+2} = a^5$

$a^3 / a^2 = a \times a \times a / a \times a = a^{3-2} = a$

Law I. The product of two powers having the same base is obtained by writing the base with an exponent equal to the sum of the exponents of the two factors.

Law II. The quotient of two powers having the same base is obtained by writing the base with an exponent equal to the difference between the exponents of the dividend and divisor.

Meaning of a fractional exponent. Suppose that we want to evaluate $a^{3/4}$.

$$a^{3/4} \cdot a^{3/4} \cdot a^{3/4} \cdot a^{3/4} = a^{3/4 + 3/4 + 3/4 + 3/4} = a^3 \text{ (Law I)}$$

The fourth power of $a^{3/4}$ is a^3 and so $a^{3/4}$ must be the fourth root of a^3. In general, the numerator of a fractional exponent represents a power to which the base is to be raised and the denominator, a root to be extracted. Then, $x^{3/2}$ means that x is to be cubed and the square root extracted. If x equals 4, this becomes $\sqrt{4^3}$ or 8.

Meaning of a^0. By the fundamental law of exponents, we get an exponent 0 when we subtract any exponent from itself, an operation that occurs when we divide any expression by itself.

$$a^3 / a^3 = a^{3-3} = a^0 = 1$$

In general, any expression with an exponent 0 is equal to unity.

Meaning of a negative exponent. If we multiply a^3 by a^{-3}, we get or a^0 so this operation, too, must be equivalent to dividing a^3 by itself. Therefore, a^{-3} must equal $1/a^3$. To generalize, any quantity with a negative exponent is equal to the reciprocal of that quantity with a positive exponent. Then, we may transfer quantities from the numerator to the denominator of an expression or vice versa by changing the sign of the exponents of all quantities transferred.

Very large or very small numbers are most conveniently handled in computation by expressing them as products of some constant by a power of 10. As examples, consider the following.

Mass of the earth 5.3×10^{27} grams
Coefficient of expansion of iron 12×10^{-6}
Molecules per liter of gas, NTP 27×10^{18}
Gravitational constant 6.6576×10^{-8}

Computations with such expressions are carried out by operating with the constant part of the expression as with any arithmetical factor and applying the exponent laws to the powers of 10. For example, we divide 42×10^{22} by 24×10^8 as follows.

$$\frac{42 \times 10^{22}}{24 \times 10^8} = \frac{7}{4} \times 10^{22-8} = \frac{7}{4} \times 10^{14} = 1.75 \times 10^{14}$$

The common factor 6 is cancelled out of the 42 and 24 and $10^{22} / 10^8$ is 10^{14}.*

*Test exercises on exponents were submitted by the author at this point.

LOGARITHMS

One very important reason for having students study fractional and negative exponents is because they have a very important practical application in logarithms. Let us tabulate a few powers of lens.

Table I.

$10^0 = 1$
$10^1 = 10$
$10^2 = 100$
$10^{-1} = 1/10$
$10^{-2} = 1/100$

We have already seen that it is very convenient to multiply or divide expressions that are powers of the same base as all we have to do is to apply the laws of exponents. It follows, therefore, that it would be very convenient if we had some way of expressing all numbers as powers of ten, the base of our number system. We can actually do this thing by resorting to the methods of higher mathematics and the results are the numbers that we call common logarithms. If we refer to a table of such values we find the following among many others.

Table II.

$\log 2 = .3010$
$\log 3 = .4771$
$\log 5 = .6990$
If $\log 2 = .3010$, $10^{.3010} = 2$
$\log 3 = .4771$, $10^{.4771} = 3$
$\log 5 = .6990$, $10^{.6990} = 5$

It may require a mental struggle to make sense out of an expression like $10^{.3010}$ but look back at the powers of ten given in Table I. Since 10^1 equals 10 and 10^0 equals 1, it seems very reasonable that 3 which lies between 1 and 10 should be represented by 10 with an exponent between 0 and 1. We cannot compute this without resort to mathematical series but let us consider another one that we can. What is the value of $10^{3/2}$? Since 10^1 equals 10 and 10^2 equals 100, the value of 10 with an exponent between 1 and 2, such as 3/2, should lie between 10 and 100. By the definition of the fractional exponent, we know that $10^{3/2}$ means that 10 is to be cubed and the square root extracted.

$10^3 = 1000$

$\sqrt{1000} = 31.6$

Let us try another.

$10 = 10^5$ with the fourth root extracted.

Fourth roots may be readily obtained by extracting the square root twice. By the previous case, we know that the square root of 100000 is 316^-. Taking the square root again, we get 18^-. In both cases, the values obtained for the fractional roots lying between 1 and 2 lay between 10 and 100 as we anticipated. Let us summarize the conclusions that we can draw from Table I.

Table III.

$10^0 = 1$	$\log\ 1 = 0$
$10^1 = 10$	$\log\ 10 = 1$
$10^2 = 100$	$\log\ 100 = 2$
$10^3 = 1000$	$\log\ 1000 = 3$
$10^{-1} = 1/10$	$\log\ 1/10 = {}^{-1}$
$10^{-2} = 1/100$	$\log\ 1/100 = {}^{-2}$

To sum up, if the number lies between 1 and 10, the logarithm lies between 0 and 1, number between 10 and 100, logarithm between 1 and 2, number between 1 and 1/10, logarithm between 0 and $^-1$, etc. In general, a logarithm consists of a whole number which may be 0 and a decimal part. We noted earlier that the logarithm of 20 should lie between 1 and 2. Actually, it is 1.3010. Let us tabulate the logarithms of various products of 2 and powers of 10.

Table IV.

Number	Logarithm
2	.3010
20	1.3010
200	2.3010
2000	3.3010

It will be noted that the abscissa or part to the right of the decimal point remains the same while the characteristic or part to the left of the decimal point changes in accordance with Table III. After one has thought this through with sufficient care to understand it, a convenient rule for determining the characteristic is the following. The characteristic

of the logarithm of a whole is always one less than the number of digits to the right of the decimal point. Now, let us consider decimal fractions.

Table V.

Number	Logarithm	Logarithm (more usual form)
.2	$-1+.3010$	$9.3010-10$
.02	$-2+.3010$	$8.3010-10$
.002	$-2+.3010$	$7.3010-10$

Here, it will be noted that the logarithms in the second column are in a very awkward form for computation because they have both a positive and a negative part. The value will be unchanged if we add and subtract 10 in each case and while this still leaves us a negative part, it puts it off at the side where its negative character is less likely to be forgotten.

We can regard the logarithm of a decimal fraction from another point of view which may help to make clear the reason that it has a positive and a negative part. The decimal fraction, .2, may be written 2/10 or 2 divided by 10. or 2 multiplied by 1/10.

$$2 = 10^{.3010}$$
$$1/10 = 10^{-1}$$
$$2 \times 1/10 = 10^{.3010} \times 10^{-1} = 10^{-1+.3010}$$

This is the value given in the second column of Table V. We may formulate a more convenient rule as follows. To get the characteristic of a decimal fraction, subtract the number of zeros between the decimal point and the first significant figure from 9 and annex —10.

After one realizes that logarithms like these are all exponents to the base 10, it is easy to see why we add logarithms when we want to multiply numbers and subtract them when we want to divide. Let us multiply 16 by 3.

log 16 = 1.2041
log 3 = .4771
log product = 1.6812 and from the log table we find that the product is 48.

Actually, what we have done is the following.

$$16 \times 3 = 10^{1.2041} \times 10^{.4771} = 10^{1.2041 + .4771}$$
$$= 10^{1.6812} = 48$$

Now, let us divide 48 by .012

log 48 = 1.6812
log .012 = 8.0792 − 10
log quotient = 3.60206
quotient = 4000

Actually, we have to subtract 8 from 1 which gives us —7 and —10 from 0 which gives us +10 so the characteristic is —7 +10 or +3.

Any power or root is readily obtained as logarithms are exponents, including roots and powers that it would be quite impossible to obtain by arithmetical means. We know from theory of exponents that any root may be obtained by dividing the exponents of the expression by the index of the root. The fifth root of $x^{10}y^5$ equal x^2y. In the same way, by theory of exponents, the exponents of the expression are multiplied by the index of the power.

$(x^2y^3)^{10} = x^{20}y^{30}$

Similarly, with logarithms, roots may be obtained as follows. Let us evaluate the fifth root of 32 with logarithms as this is easily checked since 2^5 equals 32.

log 32 = 1.50515 Divide the log by 5
log = .30103

The required root is 2.*

CONCLUSION

If you have worked your way through a portion, at least, of the foregoing problems, I imagine that you will have found an occasional one that demanded some real thought. If you did not, the fault lay rather with my selection of the material than with the subject itself for mathematical work is very easily adapted in difficulty to any level of attainment. Now, I would not wish to maintain that mathematics is the only subject that can stimulate and challenge your power of independent thought, but I do maintain that no other is so easily adjusted in difficulty to the capacity of the learner and, above all else, no other lets him know so positively when he is wrong. I hope you agree with me that a subject can contribute something to your intellectual development if it makes you use your mind to the utmost that is not found in

*Test exercises on logarithms were included by the author at this point. In the original manuscript the author also briefly discussed The Compound Interest Law, The Quadratic Equation and Square Root

one that is so handled that you are told the conclusions and merely expected to memorize them.

I do not wish to give you the impression that I would minimize the value of memorizing. A good memory is a wonderful asset in that it enables us to store away in our minds much valuable material, but I would emphasize that I do not believe storage is the highest form of intellectual achievement. Moreover, I should like to see more of you students adopt what we might call a dynamic rather than a static attitude toward your educations. I would have you all realize that every college in the land presents many times as much work as any one student can assimilate and that the competence of the individual is determined rather largely by the discrimination he exercises in selecting the part that is best adapted to his own needs. Someone estimated once that it would require more than three hundred years to take all the courses offered at Harvard but as that estimate was made a long time ago, the time required would now probably be considerably longer.

The first step in exercising proper discrimination consists in determining what you want of college. Some students are to be found there who are so immature that they regard their college years primarily as a pleasant interlude before going to work and are content if they can do just enough to keep out of the bad graces of the probation committee. Others want a degree for its value as a future talking point in selling their services or, possibly, because a framed diploma has value as an office ornament. Still others are amiably willing to learn anything today that they can be reasonably certain to use tomorrow.

But, there is another group, that could be much larger if students could be induced to become more enlightened, that sees in college an opportunity for self-discipline and intellectual development that fills their days with interesting adventures in the realm of thought and causes them to leave college equipped with great intellectual curiosity and a realization that the development of their minds has only begun.

There are three gifts that I could hope that college would bestow upon you. The first of these is an adequately trained mind and by this I mean a mind that is competent to function as effectively upon new material as well as old, and is also competent to eliminate, select, organize material and draw logical, unprejudiced conclusions. This, I am convinced can be done with real effectiveness only by college work that makes you far more than a mere accumulator of information.

The second gift is an adequate standard of values that will not let you rest content with second best if the best is attainable. As long

as you live you will find yourself confronted with the necessity of selecting some things that life offers you and rejecting others. If college has done all that it can for you, it will have taught you to "see life steadily and see it whole" so that you will not be tempted to abandon values that are real and lasting for others that are imaginary or ephemeral.

The third gift is intellectual curiosity, to the end that your mind will continue to be seeking the answer to the riddle of the universe in some form or other as long as you live. Contact with great teachers has often served to light the torch of inspiration and point out the way. Probably you students should not expect to find the perfect teacher any oftener than we teachers should expect to find the perfect student but if it be your great good fortune to encounter such a teacher, you should remain literally at his feet as long as you have opportunity and, figuratively, you will remain there for the balance of your life. Out of the association you will gain a general broadening of outlook that can only be fully comprehended if it has been experienced.

Your problem, then, in college is to make your course a purposeful rather than an aimless one and to bring all the initiative and judgment you possess to bear upon making your college years contribute effectively to your development. You need to be able to establish a rational balance between the demands of the library, playing fields, classrooms and student union. You need to develop in character in order to be sure that your training will serve worthy rather than unworthy ends. Chancellor Bruening once said that the four qualities most essential in those who would be leaders of the state are courage, honesty, magnanimity and willingness to take responsibility.

And one thing more I would hope that college would give you in the greatest possible measure. May you be able to look back upon your college years with all their friendships, privileges, dear associations and opportunities for development as a period in your life that is almost inexpressibly dear. This you can only do on condition that you live up to your responsibilities while there and that any pangs of conscience you may have to experience are merely growing pains rather than evidence of serious disorders. College ought to be the time in your life in which you have the best chance to order your life according to your own wishes. Earlier, parental authority wisely does a good deal of dictating and after college, the world at large will probably circumscribe your freedom of action with considerable relentlessness.

So, make the most of college while it is yours and make those years so good that you will be able a few decades hence to echo the sentiments

quoted by J. M. Barrie in a rectorial address delivered some years ago to the students at St. Andrew's.

"Life has not since been wholly vain,
And now I bear
Of wisdom plucked from joy and pain
Some slender share.
"But howsoever rich the store,
I'd lay it down
To feel upon my back once more
The old red gown."

POST-FLUORESCEIN TEST IN CONTACT LENS FITTING*

Jerome B. Conlogue†
Peoria, Illinois

I am happy to submit a new fluorescein test which I recently discovered. I feel confident that optometrists prescribing contact lenses will find it an invaluable aid toward attaining the perfect physically fitting contact lens. Its application has resulted in longer, comfortable wearing time for my patients and has been of immeasurable assistance to me in making lens adjustments, because it reveals poorly fitting spots and areas not detectable by present tests.

In order to differentiate this test from the fluorescein test discovered by Theo. E. Obrig in the summer of 1938, we will designate this test as the "Post-Fluorescein Test."

Test Procedure: When satisfied with the physical fit of the contact lenses, the patient is given an appointment for another day. At this time, the corneal section of the lenses is filled to overflowing with buffer solution, to which is added two or three drops of 1% fluorescein. The lenses are inserted and the patient wears them for forty-five minutes. At this time, the lenses are removed and the eyes irrigated with tepid distilled water.

The room is then darkened. By means of a dark cobalt blue filtered beam (G.E. AR-1 2½ watt glow lamp, or similar light used for the fluorescein test), the bulbar conjunctival tissue is thoroughly examined, particular attention being given to the limbal area and the emergent epithelial tissue covering the cornea. If the lenses have disturbed the tissues in or near the fluorescein pool, a yellow-green glow will reveal the offended spots or areas.

The lenses are now reinserted with clear buffer solution and the room darkened. By means of the glow lamp, the eyes and lenses are observed and the yellow-green reflexes are correspondingly marked on the contact lenses with a red grease pencil. The lenses are then removed and the patient dismissed for the day. The lenses are now ready for necessary adjustments. I advise conducting this test only once a day on a patient in order to give the disturbed tissue an opportunity to regain its normal state. This test and necessary adjustments are repeated at sub-

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sequent visits until, if possible, no fluorescein stains appear.

The optometrist's past experience and interpretation of the position and quality of yellow-green reflection will dictate whether a mere polishing of the offending area is necessary, or if stock is to be removed. The usual precaution of making only half as much adjustment as deemed necessary, is a safe procedure to follow in these cases.

The following observations and interpretations of the fluorescein stains are not the result of thorough clinical research, but are deductions gained from my experience since applying the test to forty-eight cases over a period of two months. The following clinical picture and inferences drawn are offered only as an aid to those starting to use the test with the hope that they may be beneficial. Kindly evaluate them with this thought in mind.

The resultant glow-stain of the Post-Fluorescein Test will vary from a bright yellow-green to a dull white reflection. The size of the area may range from a pinpoint isolated spot to an arc which nearly circumscribes the entire corneal-limbus area. Stains will appear just as frequently at the inferior corneal-scleral arc as the superior sulca or limbus area. The stains may extend from the sulca into the epithelial tissue of the cornea. A few cases revealed an isolated corneal stain, yet no pathology or corneal touching was apparent. Stains will frequently appear well within the liquid pool apparently quite distant from contact of the lens with the eye. However, after inserting the lenses with clear buffer solution, it will be found on rotation or versions, that a position of the eye will be noticed which causes the lens to make contact at or near the stain. The lens is marked accordingly for adjustment while the eye is in this position.

It will be revealed that practically all tissue-stained areas start in the proximity of the cord diameter or scleral apron of the lens point of contact with the conjunctiva and spread from this point toward the cornea. Theoretically speaking, it is believed that this point of contact being sharp, or tight, causes a tissue disturbance. This disturbance is not restricted to the point of friction, but by interaction of the tissue is spread to the surrounding area. The change in the tissue setup by this disorder causes an imbibation of the fluorescein and resultant stain. Inasmuch as the stain frequently extends into the epithelial tissue of the cornea where no direct lens contact is possible, this interaction of the tissue, caused by the disturbance, seems to be a plausible explanation. Although the tissue stains reveal the disturbance only where the fluorescein solution bathes the tissue, it is most probable that the tissue disturbance is equidistant from the point of lens impingement into the

scleral area away from the cornea as well as toward it.

I have found that certain stained areas are predominant. Their recurrence leads me to believe that contact lens manufacturers should study their lenses under the Post-Fluorescein Test. A change or modification of design may be indicated.

To those working on the ever-present solution problem, perhaps a study of tissue-solution interaction with the Post-Fluorescein Test may disclose the points of early imbibation of their various solutions. Also, the amount of imbibation may be visually measured.

Because of my experience with the Post-Fluorescein Test using various contact lenses, I disagree with so many who claim perfect physically fitting contact lenses, no matter what technique is employed. Although this test to date makes a more refined, physical fit by revealing disturbed areas heretofore not visually evident, I nevertheless feel that much more work must be done before such claims can be made.

A vast majority have been too complacent with the physical fit of the lenses and too quick to submerge the patients' discomforts under the category of a solution problem.

I have found that all of my patients' contact lens discomforts which I thought were of a solution nature, have disappeared when proper adjustments were made in accordance with the post-fluorescein findings. Fifty per cent who were wearing complex solutions, are now wearing a simple sodium bicarbonate solution with complete comfort and at least equal wearing time.

Adjustments made following the Post-Fluorescein Test produce principally an increase in wearing comfort. After proper lens adjustments, a definite relief was reported by patients in all cases of lacrimation, squeezing, photophobia, or injection while wearing and after removal of the lenses. In most cases, the discomforts were completely eliminated.

There has been no evidence that the adjustments made after the Post-Fluorescein Test in any way affect the clouding time. However, by removing other interferences, longer wearing time results.

I have presented my observations and deductions of this phenomenon of the Post-Fluorescein Test without further study and research in order that as many as possible will have the opportunity to apply the test. It is hoped that the accumulative knowledge thus gained will bring to light the evidence necessary to add another scientific approach to the art of contact lens application.

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AN EXPERIENCE WITH INDUSTRIAL VISION PROBLEMS*

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Among current problems facing the optometric profession is that of participation in programs for the improvement of industrial vision. Increased attention to visual screening in industry has uncovered the need for professional participation in the conduct of complete programs for the raising of the general level of visual efficiency. The writer has had, over the years, occasional contact with industry in the solution of visual problems discovered because of symptoms reported by employees. Those served worked in various industries in Athol, Mass., one of which was the Union Twist Drill Company, manufacturers of high speed drills and cutters. This company, seeking to achieve a higher level of visual performance and attempting to reduce accidents and spoilage rates, decided early in 1946 to do something about the vision of its employees. After careful consideration, they adopted a plan for industrial safety and visual efficiency which has been developed by the American Optical Company.

One of the integral parts of this program is the screening of all employees to discover those whose eyes are in need of professional care because of substandard or inadequate visual performance. This screening is accomplished by means of the Sight Screener, a modern scientific instrument developed for the purpose of measuring some of the principal individual characteristics of vision. This device which is entirely self-contained provides a method for making an inventory of the industrial employee's visual performance. Illumination of the test target is controlled so as to insure comparable test conditions for all employees. The following visual functions are checked at an actual reading distance of 14 inches without the use of lenses and at the equivalent of 20 feet by means of compensating lenses: binocular vision (suppression); acuity at near and far of each eye under binocular fixation and binocular observation for both; stereopsis; vertical phoria; lateral phoria. Provision is also made for a check, by means of pseudo-isochromatic plates, of the employee's ability to discriminate colors. It should be pointed out that the Sight Screener is not a clinical instrument and that the various tests

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†Optometrist.

are not diagnostic and do not measure visual defects. They measure visual performance or efficiency—what the employee can do with his unassisted eyes or aided by a correction, if such has been previously prescribed.

The Sight Screener was operated by the plant nurse who was thoroughly trained in this technique by American Optical Company's industrial vision consultant under the writer's supervision. Her participation in the screening was limited to asking the questions prescribed in the standard procedure, and recording on a special card provided for that purpose, the responses which the employee made on each of the tests. Screening was done in the plant, close to the employees' working stations, to reduce the time lost from productive work.

The plan for industrial safety and visual efficiency requires that a member of either the optometric or medical profession assume responsibility for decisions on the need for eye care, after study of the screening record cards. Following a request by the Union Twist Drill Company, the writer accepted the professional responsibility for its vision program. During the installation of the program, visits to the plant were made for the purpose of ascertaining the specific visual requirements of various jobs. Among the factors noted on each job were: working distance; degree of discrimination required; fixed or moving work; degree of perfection; color discrimination involved; type of hazard involved.

Knowledge of these factors was necessary in order that evaluation of screening records could be accomplished without personal contact with each employee. This presented a rather different situation than that which occurs when the patient is examined completely in the doctor's office.

All screening record cards were delivered to the writer's office for his professional decision. Following the professional interpretation and evaluation, the record cards were returned to the Union Twist Drill Company with recommendations, and thus became part of the employee's permanent record. Each employee was informed in writing of the doctor's decision as to whether he should secure professional eye care. Those who were found to require visual correction and whose job was considered hazardous enough to require protection were offered necessary eye care at company expense with complete freedom of choice as to the source of professional services. Those who were referred for such an examination received it on company time. In those cases where corrective-protective goggles were prescribed, these were based upon job requirement and were supplied at Union Twist Drill Company's ex-

pense. Upon receipt of the goggles, the employees called at the doctor's office on company time for fitting and subsequent services, as needed.

Employees with inadequate vision, working on jobs which were not classified as hazardous and, therefore, did not call for protection, were informed that they might profit from professional eye care. This to be secured, however, at their own expense and on their own time.

Tabulation of the data acquired from the screening of the entire plant showed a total of 831 employees screened, of which 209, or 25.1 per cent, were informed that they might profit from professional eye care. A total of 126 employees who were referred were provided with corrective-protective goggles at the expense of Union Twist Drill Company since their jobs required protection in addition to their professionally prescribed correction. Of those supplied with corrective-protective goggles, 10 were found to be properly corrected for their jobs so that their current prescriptions were incorporated in protective type goggles. Of the employees not in need of correction, 74 were furnished plano goggles since their jobs were considered eye-hazardous. The remaining referred employees were informed that they might profit from professional eye care but that those availing themselves of it would do so at their own expense.

A number of interesting facts concerning the visual status of a group of industrial workers were revealed by an analysis of the data* used in this study, some of which are presented in the following tables.

In order to better understand some of the visual characteristics of this group of employees, their age and sex distribution is presented in Table I.

TABLE I

Age Group	Under 20	20-29	30-39	40-49	50-59	60 & Over	Total
Male	8	134	186	118	152	86	684
Female	23	62	21	28	8	5	147
Total	31	196	207	146	160	91	831

It is interesting to note the number who are 60 years of age or older. Consideration must be given to the age factor when results of the various tests are studied.

TABLE II

	Sees Nothing	Binocular	(Far) Right Vision	Left Vision	Alternation	Total
No. of Cases	4	753	27	46	1	831
Per Cent of Cases	.48	90.61	3.25	5.54	.12	100
			(Near)			
No. of Cases	9	751	24	43	4	831
Per Cent of Cases	1.08	90.38	2.89	5.17	.48	100

*Tabulation of statistical data furnished by Union Twist Drill Company.

The results of the test for binocular simultaneous vision (suppression) are shown in Table II.

The acuity scores of all the employees at an actual reading distance of 14 inches and the optical equivalent of 20 feet are presented in Table III.

TABLE III

*Distribution of Scores of Binocular Acuity Tests for 831 Persons**

	20-200	20-100	20-70	20-50	20-40	20-30	20-20	20-15	20-10	Total
					(Far)					
No. of Cases	3	7	7	16	44	210	472	71	1	831
% of Cases	.36	.84	.84	1.93	5.30	25.27	56.80	8.54	.12	100.0
					(Near)					
No. of Cases	9	11	14	26	59	212	439	60	1	831
% of Cases	1.08	1.32	1.69	3.13	7.10	25.51	52.83	7.22	.12	100.0

*With correction, if worn.

The test for acuity, as well as the other tests, was made with correction in those cases where glasses were worn. Without correction, the acuity scores would naturally have been poorer. The tendency to score better at 20 feet than at 14 inches is without question influenced by the relatively large proportion of presbyopic employees and is a significant factor on jobs which require close working distances.

A comparison of the visual acuity of the men and women revealed that 394 out of 684 or 57.6% of the men scored 20/20 or better while 106 out of 147 or 72.1% of the women scored 20/20 or better. However, it should be remembered that the average age of women checked was lower than that of the male group.

Results of the test for depth perception (stereopsis) are presented in Table IV:

TABLE IV

			Stereopsis (Far)				
Per Cent of Stereopsis*	0	45	60	75	90	105	Total
No. of Cases	207	19	21	31	77	468	823
Per Cent of Cases	25.1	2.3	2.6	3.8	9.3	56.9	100
			(Near)				
No. of Cases	212	21	22	36	64	476	831
Per Cent of Cases	25.5	2.5	2.6	4.3	7.7	57.3	100

*According to the Fry Shepard Scale.

It appears from this data that by far most employees either have excellent depth perception or fail the test entirely with only a small percentage having varying degrees as measured by the Sight Screener.

The occurrence of vertical muscle imbalance is presented in Table V:

Examination of data on the test for vertical phoria reveals that approximately 75 per cent of the subjects showed orthophoria at far with a slightly smaller number exhibiting orthophoria at near. These

TABLE V
Vertical Phoria

	Left Hyperphoria				Right Hyperphoria				
	1½	1	½	Ortho	½	1	1½	2	Total
(Far)									
Prism Diopters	1½	1	½	Ortho	½	1	1½	2	Total
No. of Cases	13	33	52	583	89	16	5	6	797
Per Cent of Cases	1.63	4.14	6.52	73.15	11.17	2.01	.63	.75	100
(Near)									
No. of Cases	12	30	80	550	74	22	1	6	775
Per Cent of Cases	1.55	3.87	10.32	70.97	9.55	2.84	.13	.77	100

findings are in keeping with results found in other similar studies. The fact that 90 per cent fell within a range of ½ prism diopter Right of Left hyperphoria is not surprising.

Distribution of responses on lateral phoria is tabulated in Table VI.

TABLE VI
Lateral Phoria

	Esophoria—(Far)								
	Over 14	14-13	12-11	10-9	8-7	6-5	4-3	2-1	Ortho
Prism Diopters	0	0	1	4	0	12	33	31	172
Per Cent of Cases	0	0	.15	.58	0	1.76	4.83	4.54	25.18
(Near)									
No. of Cases	1	1	1	2	4	2	20	90	70
Per Cent of Cases	.13	.13	.13	.26	.52	.26	2.59	11.66	9.07

TABLE VI (Continued)
Lateral Phoria

	Exophoria (Far)								
	1-2	3-4	5-6	7-8	9-10	11-12	13-14	Over 14	Total
Prism Diopters	1-2	3-4	5-6	7-8	9-10	11-12	13-14	14	Total
No. of Cases	300	94	24	6	4	0	1	1	683
Per Cent of Cases	43.92	13.76	3.51	.89	.58	0	.15	.15	100
(Near)									
No. of Cases	217	156	81	59	34	12	14	8	772
Per Cent of Cases	28.11	20.21	10.49	7.64	4.40	1.55	1.81	1.04	100

The tendency to show more exophoria on the lateral phoria test at Near than at Far is to be expected and is in agreement with clinical findings. The wider range of reading at Near as compared to the concentration at Far is another characteristic which clinical data support.

Ten per cent of the employees were found to be color deficient when checked by means of pseudo-isochromatic plates in a special abridged form for industry.

The number of employees among the various age groups that wear glasses while working is shown in Table VII.

These data become especially significant in those plants employing an excessively large proportion of older workmen.

TABLE VII

83 out of 91 or 91.2% employees 60 years of age and older wear glasses while working.
140 out of 160 or 87.5% employees between 50 and 60 wear glasses while working.
87 out of 146 or 60.0% employees between 40 and 50 wear glasses while working.
74 out of 207 or 35.7% employees between 30 and 40 wear glasses while working.
64 out of 196 or 32.7% employees between 20 and 30 wear glasses while working.
13 out of 31 or 41.9% employees under 20 years of age wear glasses while working.
461 out of a total of 831 or 55.5% employees wear glasses while working.

In addition to the screening of all employees presently employed, each new hire is given the complete battery of tests at the time he is employed. The record of the initial screening becomes a part of the permanent record and may be referred to in compensation cases. Screening records developed subsequent to recommended eye care are also made part of the file.

Periodic retesting of all employees, which is another phase of the program, will aid in the discovery of losses of visual efficiency that accrue with age, illness and other causes. It is planned that all employees will be checked once a year.

The management of the Union Twist Drill Company is well satisfied with the results of their vision program from the standpoint of safety and visual efficiency. One reason for this is the fact that their accident rate has dropped sharply since the program was inaugurated. In one case, a pair of corrective-protective goggles saved an eye of a previously unprotected skilled worker when a small grinding wheel rotating at approximately 20,000 revolutions a minute broke and particles struck a lens of his goggles. The company feels that this one experience fully justified and paid for its entire vision program.

This experience in the Union Twist Drill Company's vision program has led to the following conclusions:

1. Considerable unsuspected defective vision exists among industrial workers.
2. Employees become safer workers when visual efficiencies are detected and corrected as part of a continuing process.
3. Beyond visits to the plant for purpose of observing the visual requirements of the various jobs, nothing more than the usual professional skills was required of the optometrist.

The entire procedure has developed for the writer a wider appreciation of the place which the optometrist can occupy in programs of industrial visual improvement.

STARRETT BLDG.
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THE DISTINGUISHED SERVICE FOUNDATION OF OPTOMETRY

Twenty years ago the Distinguished Service Foundation of Optometry was founded in Boston. Brought into being by one of the great leaders in optometry, the Foundation continues today as a vital force in stimulating the interest of all optometrists in the basic sciences upon which the structure of ocular refraction rests.

Dr. George S. Houghton, founder of the Foundation, and the optometrists who were associated with him and who have continued to carry on the work since his death, have made a very lasting contribution

to optometric life in these first twenty years of the Foundation's existence. They have done much to bring optometrists into closer working relationship with research workers in the broad fields of applied science and have materially assisted in bringing the horizon-wide factors of academic education into focus with the technical skills required of the optometrist.

This work of the Foundation must continue. To be sure, it parallels to some degree the activities of the Academy, but the overlapping, where this exists is but minor, and the work itself is of such value to the profession that the Foundation must be given the additional financial support it requires to function properly.

Dr. Clinton R. Padelford, optometrist of Fall River, Massachusetts, is now Director of the Foundation. He is carrying on the work started by Dr. Houghton. His leadership and administrative skill are unquestioned. Dr. Laurence P. Folsom, optometrist of South Royalton, Vermont, now serving as Foundation Secretary, is associated with him. These men and their colleagues in the Foundation are worthy of profession-wide support in giving to this organization the full measure of financial strength it requires to fill its role in present day optometric affairs.

This twentieth anniversary year of the Foundation would be a fitting one for the entire profession to over-subscribe a campaign for funds for the Distinguished Service Foundation of Optometry.

CAREL C. KOCH.

THE REFINED ART OF FITTING OCULAR PROSTHESIS

During recent years in America, the fitting of artificial eyes, or what modernly is called ocular prosthesis, has been somewhat diverted away from the optometrist. This work was almost entirely in his hands until the late twenties or early thirties, but is now in part at least done by technicians who either mould and individually make the artificial eyes for patients in need of this service, or who fit "stock" eyes which serve much the same purpose.

As a rule, these technicians are connected with large optical laboratories which also supply other ophthalmic materials. Some, however, are in individual offices doing work sent to them by optometrists and ophthalmologists.

Time will tell whether or not this change has been to the patients' advantage, but the writer suspects that anyone needing an artificial eye

would be better served today if optometrists who specialized in this work would fill the requirements of these patients by using the techniques which follow the moulding procedures used in making contact lenses.

These thoughts, on this quasi-optometric subject, came to mind while reading the new book, "Ocular Prosthesis" by the British optometrist, Mr. J. H. Prince.[1]

Shortly after World War I, the writer started to practice optometry and was fortunate in being able to serve under an older optometrist who was both competent and well versed in relieving the visual problems of his patients. At that time, many persons came to our office for artificial eyes, and I well remember my early experiences in helping patients make their own selection.

We had, as I recall, several large drawers, each partitioned off in many small squares and one glass eye, either reform or shell, was kept in each of these compartments. After the patient arrived, and the general color of the needed eye was determined, one telephoned a nearby laboratory which immediately dispatched by messenger a large assortment of eyes of more or less that color. These glass eyes, along with our own "stock" of artificial eyes, frequently gave the patient a choice of several hundred eyes from which to make a selection.

The techniques in so doing were simple. The drawers and trays of eyes were laid out on a long table in one of the refracting rooms. The patient was given several towels, a glass of water in which to dip the eyes, a chair and a mirror and then was left largely to his own devices. Some patients could make a selection in fifteen minutes; others took hours. The whole business was carried out on a strictly trial and error basis with the patient first dipping the trial eye in the water and then inserting and removing it until one particular eye was found which seemed to suit his fancy.

The cost of an eye was $5. If one was selected from our own stock we made an arbitrary replacement from those sent us on consignment, and the matter was at an end until repeated because of breakage or wear, at which time the patient returned to have another try at the collection of glass eyes. That this procedure lacked something in the way of being hygienic is obvious. The selection was usually made under rather dim artificial light which made the iris color match poor and the whole job was messy and bad from the standpoint of patient reactions.

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[1]J. H. Prince. Ocular Prosthesis. Published by the Williams and Williams Company, Baltimore, Maryland. 134 pages. Illustrated. Cloth. $4. 1946.

It has been fifteen years since I have seen a tray of glass eyes and so this new book comes as something of a shock. I had expected some change in techniques but did not look for the progress outlined. In the first place (and I suppose I should have expected this), the eyes are now made of plastics. And the author informs us that they are moulded in quite the same manner as are contact lenses. The author also describes a technique of selection of iris color and reviews a procedure in which the size of both the iris and pupil can be established and also these can be properly placed in the plastic eye so that their appearance in the orbital cavity is satisfactory to both the patient and to those looking at the patient.

Prince has developed and refined the techniques of making and fitting artificial eyes to a very marked degree and we presume that more or less similar refinements of procedure are being followed in America by optometrists and others who now do this work over here.

Optometrists trained to make contact lenses and who do this intricate moulding work in their offices may be interested, too, in these new, advanced techniques of artificial eye making suggested by Prince. Thus giving to those patients who need these cosmetic aids better service than can be secured by the use of the stock artificial eye. This would be particularly true in the smaller centers away from present day laboratory services found only in the larger cities.

CAREL C. KOCH

TRANSACTIONS OF THE AMERICAN ACADEMY OF OPTOMETRY

A department devoted to announcements, reports, appointments, organization data, news, professional problems and ideals, as these relate to the Academy.

MAY MEETING OF THE ACADEMY

All necessary convention arrangements have been made for the coming meeting the American Academy of Optometry in Philadelphia, Pennsylvania, May 18, 19, 20 and 21, 1947, at the Bellevue-Stratford Hotel.

The program,[1] which will be very similar to the one planned for postponed meeting of last December, has been approved and the necessary hotel arrangements concluded. Members of the Academy who plan to attend should now write and arrange for personal hotel reservations.

[1]Program of the Annual Meeting of the Academy at Philadelphia. Am. Jour Optom. & Arch. Am. Acad. Optom. 23. 10. 451-455. 1946.

1947 ROSTER

Copy for a new Academy roster is now at the printers. This 1947 booklet will contain, as did prior editions, the constitution and by-laws, a copy of the fellowship pledge and membership agreement, a list of Academy meetings from 1922 to the present time, a list of officers and members of the executive council and both an alphabetical and geographical list of members. The booklet will be mailed to members during the latter part of February.

NEWLY FORMED EASTERN PENNSYLVANIA CHAPTER

Officers and an executive council were elected at the January meeting of the newly-organized Eastern Pennsylvania Chapter of the American Academy of Optometry. The officers named were: Dr. William O. Vivian, president; Dr. Luther A. Garns, vice-president; Dr. William G. Walton, Jr., secretary-treasurer.

Drs. John C. Neill, Lawrence Fitch and Fred W. Sutor were selected to serve on the executive council.

Other charter members of the group are: Drs. Charles J. Bertotto, Frank A. Blence, David Brezel, Jacob Cohen, Gilda Coppola, Henry N. Fisher, George A. MacElree, Jr., William J. McEvoy, Albert Fitch, Edwin H. Manwiller, Russell S. Manwiller, Fred E. Muller, J. F. Neill, Frederick Wm. Sinn, Frank M. Stever and Gordon W. Venable.

The constitution and by-laws adopted by this group appear in this issue.

This new chapter will hold periodic meetings at which technical material will be presented.

Current Comments by Virginia Huck

Editorial Assistant

Optometrists will confer a favor by sending news items of general interest for this department; such as relate to new instruments, clinical techniques, education, visual health and optometric legislation and organization.

MAYBE WE'LL GET THE DENTURES!

A new regulation which optometrists specializing in the fitting of artificial eyes have been expecting for some time was finally issued by the Veterans Administration. But the new ruling wasn't what they were expecting!

This regulation had to do with a program whereby veterans who

lost the use of an eye during the war would be entitled to a tailor-made, moulded plastic eye instead of the stock glass eye now furnished. The plastic eye has been found to more nearly match the human eye and on the whole, more satisfactory than the glass eye.

Optometrists were all set to start work on the new program—until they read the last paragraph of the order issued by the Veterans Administration.

The work, according to the VA edict, is to be done by *dentists!*

Many letters of protest have already been received by the Editor demanding that our optometric leaders take steps to get this work back in optometric hands.

ELEVEN JOIN SPECIALISTS' RANKS

Eleven more optometrists were added in January to the ever-growing list of practitioners who have completed graduate training in the highly specialized work of contact lens fitting:

Drs. Jacob Cohen, Leonard D. Friedman and Morton Zucker of Philadelphia; Dr. Raymond Lenneau Eng, Oakland, California; Dr. Cletes B. Gray, Memphis, Tennessee; Dr. Louis I. Iskowitz, Pittsburgh, Pennsylvania; Dr. James B. Kirk, Adrian, Michigan; Dr. Victor Thomas Laliats, Bridgeport, Connecticut; Dr. Morris Wise, Hartford, Connecticut; Dr. Frederick Milton Mercury, Washington, D. C., and Dr. George Sheppard, Riverside, New Jersey.

These men completed the course conducted by the Pennsylvania State College of Optometry from December 26, 1946, through January 3, 1947.

PROPER STUDENT ENROLLMENT

A news release passed across the writer's desk the other day which might have been considered routine, except for one significant phrase.

The Pennsylvania State College of Optometry, according to the news item, has closed registration for their freshman class beginning in March, 1947, after enrolling a total of 140 students—*"no larger than the number as was matriculated before the war."*

This is a gratifying report which has been received not only from this school, but many other optometric colleges, and is indicative the majority of our centers of learning are attempting to hold enrollment at levels at which proper undergraduate training can be given.

COURT RULING ON FOLLOW-UP LETTERS

Optometrists whose organizations prohibit them from advertis-

ing except for sending a brief notice to former patients suggesting it is time for re-examination, may be interested in a recent ruling by the Superior Court of Montreal.

A Canadian optometrist was recently hailed into court by the Quebec College of Optometrists because he sent notices of this type to his patients. The college, in its complaint, claimed this was a violation of the Quebec Optometrists and Opticians Act.

The action was dismissed by the court. In his decision, Mr. Justice Archambault ruled that the 'defendant did not violate the law. He pointed out it was common practice in professional circles to use such forms of announcements.

SPECIAL REPORT

EASTERN PENNSYLVANIA CHAPTER—AMERICAN ACADEMY OF OPTOMETRY

CONSTITUTION AND BY-LAWS

CONSTITUTION

ARTICLE I. NAME

The name of this organization shall be "The American Academy of Optometry—Eastern Pennsylvania Chapter."

ARTICLE II. OBJECT

The object of this organization shall be to further the development of the visual science in its efforts to conserve human vision by:

(1) Granting unqualified and unstinted support to the several objectives of the parent organization, The American Academy of Optometry, as these are expressed in the constitution of that body.

(2) Assuming the responsibility of leadership within the State of Pennsylvania in the field of professional optometry, in the promotion and maintenance of the highest ethical principles, in the advocation of increased standards of education, and in unselfish service to the public.

(3) Supporting, as a body and through its individual membership, the Pennsylvania Optometric Association in all endeavors for the welfare of the profession, in the maintenance of its membership, and by wholehearted participation and unstinted service in its ranks.

(4) Aiding and abetting, by whatever cooperative effort required, any groups, organizations, professions, and institutions concerned with the increased visual welfare of humanity.

That these principles may be accomplished in fact, the Eastern Pennsylvania Chapter has formulated and is guided by a rigid and strict code of ethics and of professional qualifications.

ARTICLE III. OFFICERS

The officers of the Eastern Pennsylvania Chapter shall be: a president; a vice-president; a secretary-treasurer; and an executive council which shall consist of the officers, the immediate ex-president and two other members; all to be elected at the annual meeting of the Chapter, and to serve until the next annual meeting or until their successors have been elected.

ARTICLE IV. MEMBERSHIP

Membership in the Eastern Pennsylvania Chapter shall be restricted to optometrists and scientists of recognized professional ability and ethical standing who shall be elected to membership as provided in the By-Laws.

ARTICLE V. VOTING AND AMENDMENTS

Section 1. All amendments to this constitution and to the following By-Laws may be made by the following procedure:

(1) A written copy of the proposed amendment must be submitted to the secretary not less than sixty days prior to the scheduled annual meeting of the Chapter.

(2) The Executive Council shall vote upon this amendment and if favorably inclined, shall submit a written copy of the amendment to each member of the Chapter not less than thirty days prior to the annual meeting.

Section 2. An affirmative vote of not less than two-thirds of sixty per cent of the entire membership is required for the enactment of an amendment.

Section 3. If less than sixty per cent of the membership are in attendance, a vote shall be taken by mail.

Section 4. Failure to vote on an amendment within two weeks after its receipt, shall transfer the vote to the executive council.

Section 5. Where the executive council rejects a proposed amendment, notification of its rejection must be given the sponsor by the secretary, not less than thirty days prior to the annual meeting. If the sponsor can secure the signature of two-fifths of the members in support

of the proposal, the proposal shall be resubmitted to the secretary and issued in individual copies for study by the entire membership not less than ten days prior to the annual meeting. The decision of the executive council shall be considered overruled and voting shall take place upon the amendment as is provided above.

BY-LAWS

ARTICLE I. DUTIES OF OFFICERS

Section 1. The President shall preside at all meetings of the Chapter, and shall be Chairman of the executive council. He shall appoint all committees subject to the approval of the executive council. He shall perform the duties usually devolving on the office and such others as may be directed by the Chapter.

Section 2. The Vice-President shall assume the duties of the president in his absence or at his request. He shall also share the responsibility of the treasurer in the disbursement of funds by countersigning all orders, notes, or checks for withdrawal of funds.

Section 3. The secretary-treasurer shall keep a record of all proceedings of the Chapter and of the executive council, conduct correspondence, collect dues, notify members of the dates of meetings a reasonable time in advance and perform such other duties as pertain to his office or as may be prescribed in the By-Laws. He shall also keep all money of the Chapter, and disburse same upon joint signature of the vice-president, keep a correct account of all transactions and report them at each meeting, or when required by the president, and make a full and detailed report of the financial affairs of the Chapter, and shall at the expiration of his term of office, deliver to his successor, all funds, papers, and books relative thereto.

Section 4. The executive council shall transact all business of the Chapter between annual meetings and shall assume such other duties as may be delegated to it by the Chapter. It shall audit the books of the secretary-treasurer. On all matters coming before it for action of decision, a majority vote of the council shall prevail. It shall have full authority to act for the Chapter in any crisis or emergency.

The executive council shall also serve as a planning and policy screening board to formulate policies and suggest plans; and to plan a specific course of procedure for the execution of those policies of service which are embodied in the President's annual address.

Section 5. Those members of the executive council not holding other office shall form a committee on admissions for the Eastern Penn-

sylvania Chapter and shall pass upon the technical proficiency of new applicants. This committee shall be empowered to conduct examinations, or to utilize any methods deemed necessary in the consideration of an applicant's ability.

ARTICLE II. ACADEMY FELLOWSHIP

Section 1. Membership is open to any practicing optometrist who meets the following requirements or to educators, scientists, and non-practicing optometrists who have conspicuously accredited themselves in the service of conserving vision.

Section 2. All practicing optometrists must be members in good standing of the Pennsylvania Optometric Association.

Section 3. Membership in the Eastern Pennsylvania Chapter can only be granted where the candidate is also acceptable as a Fellow of the American Academy of Optometry, and is accepted to such fellowship either prior to or simultaneously with acceptance to the Eastern Pennsylvania Chapter. An application for membership to the Eastern Pennsylvania Chapter is, therefore, a simultaneous application to the parent body. A single form is used for both. A candidate accepted directly into the American Academy is automatically a member of the Eastern Pennsylvania Chapter.

ARTICLE III. PROCEDURE OF ELECTION TO FELLOWSHIP

A candidate for membership may make application in one of the two following manners.

Section 1. Application to the Chapter.

(1) The candidate may submit the standard application form and the $5.00 examination fee to the secretary of the Chapter.

(2) The secretary will refer the application to the committee on admissions who shall determine the candidate's technical proficiency by any means required. A written report shall be made to the balance of the executive committee. If favorable, a member will be delegated to investigate the environment and characteristics of the candidate's place of practice; and to file a written report, in duplicate, with the Chapter secretary.

(3) A written report shall be made to the executive council. The secretary shall then request the entire membership of the Chapter to vote upon acceptance of the candidate. An unanimous vote is required for acceptance.

(4) If such a vote is recorded, the candidate's name shall be then submitted to the executive council of the American Academy,

along with a duplicate of the inspection report filed with the Chapter secretary. Upon confirmation of the acceptance by the executive council of the American Academy, the secretary of the Eastern Pennsylvania Chapter shall then notify the applicant of his admission to both the Academy and the Chapter.

(5) If the Chapter does not record an unanimous vote in favor of admission, the candidate may gain admission by meeting the second method of entrance.

(6) If the American Academy does not confirm the favorable unanimous vote of the Chapter, the candidate may not be admitted to the Chapter.

Section 2. Application directly to the Academy.

(1) A candidate who has failed to achieve an unanimous vote in his favor, or who prefers to apply directly to the American Academy, may apply directly to the American Academy by fulfilling the procedures listed in the By-Laws of the American Academy. If he is favorably accepted by the body, he will automatically become a member of the Eastern Pennsylvania Chapter without the necessity of the Chapter acting upon his admission.

ARTICLE IV. SPECIFIC REGULATIONS CONCERNING MEMBERSHIP

Section 1. Candidates for fellowship and members are automatically pledged and required to meet the standards of practice which apply universally to all professions, and are judged by comparison to the manner in which these standards are exercised in the environment of the practitioner by all professional men located in that vicinity.

Section 2. To avoid embarrassment to any prospective candidate, and to serve as a guide, the following general details are noted as minimum requirements:

(1) Location. An upstairs location is preferred in all instances and is mandatory for locations in the business districts of large cities. Location in a residence is acceptable for this detail. A downstairs location is only acceptable in smaller communities or in outlying sections of larger ones, and then only if such a location is a common practice among members of the other professions practicing in that same town or district.

(2) External Appearance. The appearance of the exterior must be of the same characteristics as those of the offices of similarly

located physicians, dentists, etc. A store front shielded by drapes or blinds is not considered equivalent to a cottage type or clinic type downstairs building.

(3) External Signs. Window and door signs must be in conformity with the regulations of the building and the practices of other professions located therein. Overhanging signs, overhead signs or illuminated signs are not acceptable other than shingles protruding from the wall which are in conformity with those used generally. Lettering of excessive size, etc., is not acceptable. In downstairs offices, window display type of lettering over large windows is not desirable unless common practice in the community. Display windows of any type which are not totally screened from the public are not acceptable.

(4) Internal Appearance. The reception room should be totally separate from the operating rooms. No display posters or manufacturer's displays are acceptable. The laboratory and fitting table should not be visible from the reception room.

(5) Stationery. All letterheads, envelopes, statements, etc., must be dignified, simple and free of advertising or claims. Cards must carry no advertising matter.

(6) Advertising. Beyond standard reminder letters, no forms of advertising are permitted, with the exception that a professional card may be published in the local paper, if such is the custom in the community among professional practitioners. Such notices must compare favorably with those published in the same paper. Classified telephone book advertising beyond listing in ordinary type is not acceptable. Educational or informational programs in either newspapers or over the radio are acceptable only on behalf of a group or association and only when advanced for the benefit of the profession and not any single individual or individuals.

(7) Subsidiary Practices. No member may engage in any form of practice accessory to that of Optometry such as the sale of earphones or hearing devices, of optical accessories, etc., nor may any member practice any other profession.

ARTICLE V. DUES AND ASSESSMENTS

Section 1. An examination fee of five dollars ($5.00) must accompany each application, which fee shall be retained by the Eastern

Pennsylvania Chapter. When the application shall have been approved by the executive council of the American Academy of Optometry the (A.A.O.) secretary shall collect the certificate fee of five dollars ($5.00) and the annual dues of fifteen dollars ($15.00). Said secretary may also collect the Eastern Pennsylvania Chapter dues of three dollars ($3.00) which shall be returned to the Chapter secretary along with the two dollars ($2.00) allocated to the Chapter out of the national dues paid by a Fellow in Eastern Pennsylvania.

Section 2. The annual dues of a non-practicing member shall be $8.00 per year of which $3.00 shall be retained by the Chapter and $5.00 submitted to the parent body.

Section 3. Any Fellow of the Academy whose dues and assessments remain unpaid on April 1, shall stand suspended. In event payment has not been made by July 1, his Fellowship in the Academy may cease, and he shall be so notified by the secretary. He may be reinstated by action of the executive council of the national body and upon payment of all amounts due at the time fellowship was forfeited.

ARTICLE VI. ACADEMY MEETINGS

Section 1. The Chapter shall meet five times yearly, the first Tuesday of September, November, January, March, and May. The executive council shall set the time of day and place of meeting; further, it shall be the prerogative of the executive council to call special meetings or alter the date of regular meetings for adequate reason. The meeting in May of each year shall be considered the Annual Meeting. A complete report of each meeting shall be sent to the secretary of the American Academy.

Section 2. The executive council may meet independently when called to do so by the president or by four of the seven executive council members.

ARTICLE VII. DUTY TO THE ACADEMY

Section 1. The Chapter will make an earnest effort to induce all eligible and desirable optometrists to make application for membership.

Section 2. Any Fellow of the Academy who knows of another's failure to maintain the standards required by the constitution shall be obliged to make a written report of his knowledge, and shall send such a report to both the secretary of the Chapter and the secretary of the American Academy. The secretary of the Chapter shall see that this report is investigated and shall notify the secretary of the American Academy of the findings. Should the accused admit the justice of the

complaint and correct the fault, no official action shall be taken. Should the accused question the justice of the complaint, or should he fail to rectify it after admitting it, the secretary of the Chapter shall notify the executive council of the Chapter. The executive council shall then file a formal report to the secretary of the American Academy, who shall collect such further evidence as he desires and submit it to the executive council of the American Academy. It shall be the responsibility of the American Academy to take such final action as it deems necessary and the action of the executive council of the American Academy shall be binding upon the Chapter.

BOOK NOTICES

PRIMARY PROCEDURE IN VISION TRAINING. A. S. Nichols. Published by Keystone View Company. 194 Pages. $2.50. 1946. 1946.

Nichols points out that on the premise, "seeing is motor," the myope and the hyperope do not perceive the size of tri-dimensional objects or their distance in space in the same manner. "Also," she adds, "since seeing is motor, elimination of the lag between the visual stimulus and the appropriate motor performance is a prerequisite to skillful or accurate perception."

This manual on visual training is divided into two parts: primary procedure and pointer method. The primary steps in visual training, as outlined by the author, are: (1) monocular rotations and fixations; (2) accommodative training; (3) monocular projection; (4) chiroscopic drawings; (5) binocular perception; (6) binocular disparator through plus or minus; (7) increased plus acceptance at near, intermediate and far point; and (8) establish pattern projection, stereopsis and acuity in the central field of space.

Additional steps are suggested to determine progress and readiness for pointer training.

The section devoted to pointer training is a revision of the work presented by Nichols three years ago.*

With regard to accommodative training, Nichols has this to say: "The patient is not to be given accommodative rock (training) until he interprets the image as nearer on the minus side and further away on the plano side."

*Pointer Training Techniques. Keystone View Company. 1943.

Targets advocated are the pine fusion series on the grounds "these targets have been found to elicit a more satisfactory response than does print. They offer peripheral stimulation and monocular space perception and provide a type of training to build a high measurable amplitude when trained with small amounts of minus."

Optometrists who utilize Keystone instrumentation in their orthoptic training procedures will find this a detailed and well illustrated monograph.

R. EHRENBERG

ANNOUNCEMENTS

PENNSYLVANIA STATE COLLEGE OF OPTOMETRY

FRESHMAN REGISTRATION

December, 1947, is the next date for which students may register as freshmen at the Pennsylvania State College of Optometry, according to school officials.

Registration for the March, 1947, freshman class has been closed. A total of 140 students, 116 of whom are veterans, are now enrolled in the March class. Students from five foreign countries also are registered, including England, British West Indies, British Guiana, Hawaii and Porto Rico.

CONTACT LENS COURSES

The Pennsylvania State College of Optometry is offering graduate courses in the fitting of contact lenses in February and March. One begins February 24, the other, March 6. Each will run for two weeks.

Instruction includes chemistry, optics, ocular anatomy and ocular pathology in the fitting of contact lenses.

The instructors are O. G. Rybachok, M.A.; Jacob Nevyas, Ph.D.; G. A. MacElree, O.D.; F. A. Sinn, O.D.; and John C. Neill, O.D.

Optometrists interested in enrolling should immediately write or wire the Registrar, Pennsylvania State College of Optometry, 6100 North 12th Street, Philadelphia 41, Pennsylvania.

Veterans should make application at their local Veterans' Administration office for educational benefits under the G.I. Bill of Rights.

ABSTRACTS

A department in which will appear abstracts of the literature of optometry, ophthalmology and applied optics. These will be classified according to the following list although contributions to all sections will not necessarily appear in each issue.

1. Ocular Refraction.
2. Physiological Optics and Color Vision.
3. Ocular Muscles.
4. Orthoptics and Reading.
5. Anatomy, Histology and Embryology.
6. Ocular and General Pathology.
7. Ophthalmic Lenses and Material.
8. Instruments.
9. Hygiene and Illumination.
10. Applied and Physical Optics.
11. Education, Sociology and Economics.
12. Miscellaneous.

1. Ocular Refraction

BIFOCALS IN ANISOMETROPIA. N. Millman. The Optical Journal and Review of Optometry. 1946. 83. 17. 33.

The author suggests the use of a set of opaque discs with clear bifocal-like segments left at the bottom of the discs. These discs are to be used only in a trial frame in those cases of high anisometropia where the vertical prismatic displacement would be a factor in the successful use of a bifocal. The patient would use the new correction with the discs in place in the trial frame for a reading period, his line of vision passing through the segment area of each disc. If prisms were required the examiner could also experiment with these in various powers before having the bifocal correction made up in the laboratory.

A. V. H.

AMBLYOPIA EX ANOPSIA IN THE ARMED FORCES. G. E. Morgan. American Journal of Ophthalmology. 1946. 29. 6. 713.

The author reviews 77 cases of amblyopia ex anopsia as seen in the armed services. Of these, 43 cases were associated with squint, 23 cases with anisometropia of marked degree, while in 11 cases no etiologic factor was indicated. The author comments on the fact that in only a few of these cases was occlusion suggested as a therapeutic aid by the examiners who treated these patients during their childhood.

C. C. K.

OPTOMETRIC VISUAL SURVEY IN THE SCHOOLS OF FOUR MASSACHUSETTS TOWNS. J. B. O'Shea. The Journal of the American Optometric Association. 1946. 17. 5. 253-260.

Under the supervision of the author, 1,150 students in the Brookfield area were given an ocular survey consisting of the following tests:

Visual acuity at 20 feet; visual discrimination with fixation at 20 feet through + 1.50 D. Spheres; static skiametry; dynamic skiametry; cover test with fixation first at 20 feet, then at 14 inches; versions; tests for fixation ability; pupillary size and reactions; near point of convergence; near point visual acuity test with fixation at 14 inches; amplitude of accommodation; vertical and horizontal phorias; fusion and stereopsis. An external ocular examination and an ophthalmoscopy were also made and in about 20 per cent of the cases photographs were made of the eye movements.

Of the group surveyed, 723 passed the tests, while 427 of the students failed in one or more of the tests.

C. C. K.

A PHYSIOLOGICAL BASIS FOR THE NEED OF REDUCING THE PLUS POWER OF NEAR CORRECTIONS. P. L. Connolly. The Michigan Optometrist. 1947. 26. 1. 3.

The author finds too many optometrists making their near-point phoria and accommodative tests with patient fixation directly before the eyes. As indicated in a prior paper[1] these findings are not always the same as those found when the tests are made with fixation from 30° to 40° below the eye level. This latter being the position usually adopted by the patient in reading or other near-point work. The author reviews a series of experiments made in this field and suggests that all reading corrections be tested in a trial frame with the patient in natural posture before the final correction is decided upon.

C. C. K.

AN ANALYSIS OF PROFESSIONAL EYE CARE AND INDUSTRIAL EFFICIENCY. N. C. Kephart. Transactions, American Academy of Ophthalmology and Otolaryngology. 1946. March-April. 166-178.

Of an entire group of 45 hosiery pairing workers, 31 remained on this job a year and were tested with the Ortho-Rater twice, approximately one year elapsing between each test. Of the 31 thus tested, 17 had eye care during the year.

After visual standards were established for the job, those passing these standards and those not passing the standards were studied. Of the 31, 14 cases failed and 17 cases passed. Of those who did not pass, 9 received eye care; of those who passed 8 cases received eye care.

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[1]Connolly & Koprowski. Changes in lateral phorias with vertical changes in fixation. Am. Jour. Optom. & Arch. Am. Acad. Optom. 22. 9. 399-405. 1945.

The increase over a year's time in average hourly earnings for the 17 workers receiving eye care (whether they passed or did not pass the visual standards), was from 6.7 cents per hour to 21.7 cents, the difference being 15 cents.

The increase over the year's time for workers not receiving eye care was not as great as the "eye care" group, the change here being 12.6 cents to 17.9 cents per hour, an increase of 5.3 cents.

When the group receiving eye care and the group not receiving eye care were compared, the former group made nearly five times more progress in average hourly earnings.

Average scores on each of the twelve tests in the Ortho-Rater were calculated for each administration of the two tests, i.e., the one given in 1944 and the other in 1945. There seemed to be considerable improvement in some tests for the group who received eye care. The group not receiving eye care showed virtually negligible change in average test scores.

Experience has shown that small average changes in scores on the Ortho-Rater are very often statistically significant. In the case of the average improvement of scores for the group who received eye care, the reviewer would have appreciated a report on critical ratios of differences, which were not reported.

N. F. S.

NOTES ON PRESBYOPIC CORRECTIONS. G. Shackleton. The Optician (London). 1945. 109. 2827. 303-304.

In prescribing the initial single vision presbyopic correction for a patient who has never used glasses, the optometrist should, according to Shackleton, (1) take great pains to be sure the patient understands that the correction will fog distance vision somewhat, and that he understands the reason for this fogging, and (2) prescribe a slight undercorrection at first, as the patient is probably used to holding reading matter at a somewhat greater distance from his eyes than normal, and an adjustment to a full correction for reading might prove troublesome.

C. C. K.

TECHNIQUE OF SCREENING EYE DEFECTS IN MASS EXAMINATIONS. James A. Inciardi. Eye, Ear, Nose and Throat Monthly. 1945. 24. 9. 419-422.

A study of the records of twenty-five thousand men who passed through the Armed Forces Induction Station, New York City, is made

by the author. These men were given visual screening tests, an external ocular inspection and an ophthalmoscopic examination. Following this they were divided into three main groups:

(1) Men with minimum uncorrected vision of 20/200 in each eye, correctible to at least 20/40 in each eye. This group included no men with amblyopia, ocular disease or disfiguring defect. Group one comprised 88.3 per cent of the total number examined.

(2) Men with minimum uncorrected vision of 20/400 in each eye, correctible to at least 20/40 in each eye and also those subjects who were suffering from an amaurosis or moderate amblyopia in which the vision could be improved to 20/100 in the poor eye and 20/20 in the better one. In this group were those subjects whose subnormal vision was caused by static chorioretinitis, amblyopia ex anopsia, corneal opacity, stationary cataract, optic atrophy, phthisis bulbi and ptosis. Group two comprised 9.2 per cent of the total examined and about one-half of these were myopes of high degree.

(3) Men suffering from ocular pathology, very high myopia, nystagmus, strabismus, aphakia, and the absence of an eye. These men were all disqualified for military duty. Group three comprised 2.5 per cent of the total number examined.

C. C. K.

FOLLOWING CANTONNET. J. C. Gillie. The Optician (London). 1945. 109. 2822. 203.

One of Cantonnet's far-reaching proposals was his suggestion that in squint and other problem cases both the non-dominant and the dominant eye should be corrected by the same power of lens.

The author points out that Cantonnet's reason for this suggestion was that the non-dominant eye was not used for foveal vision but only for peripheral vision with its foveal vision suppressed. If the image of the non-dominant eye is made as sharp as the image of the dominant eye, then suppression is made more difficult. The author presents a case report illustrating this point.

C. C. K.

Modernize for Modern Eyes

Your selection of cosmetic frames demands the Hussy's high styling, the Winger's quiet charm and the Midway's ruggedness.

Optically perfect, these Konoptics form a trio of smart, practical frames fashioned for smartness; built for utility.

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When light passes through a Therminon lens it is "filtered" . . . "filtered" because many of the harsh, irritating and invisible infra-red rays are absorbed. Yet useful and visible light is transmitted to the eye.

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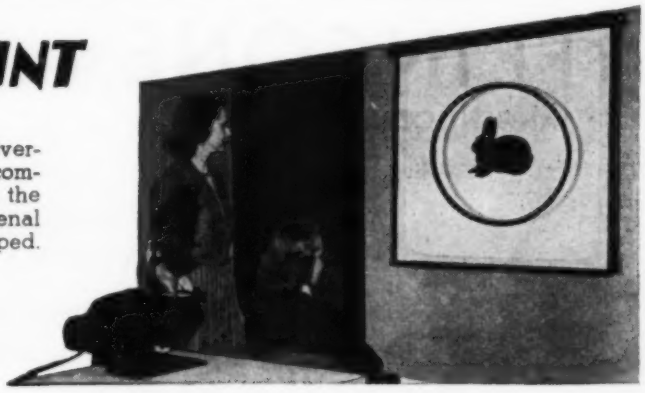

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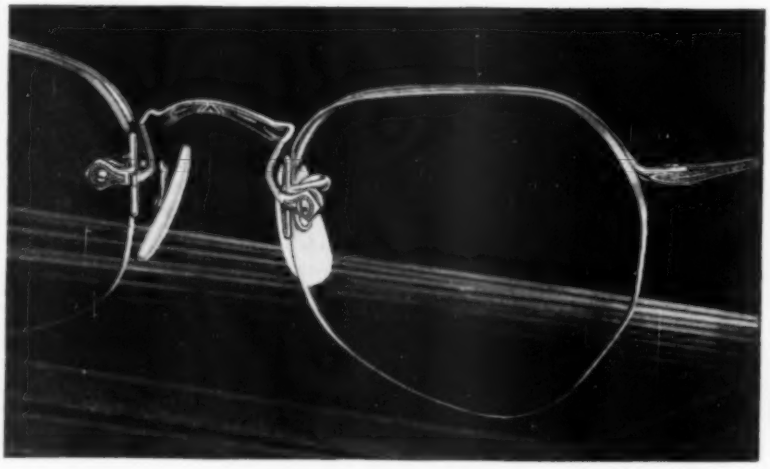

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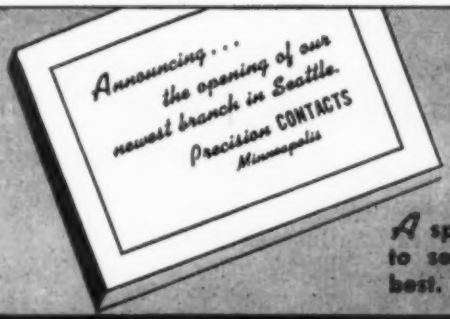

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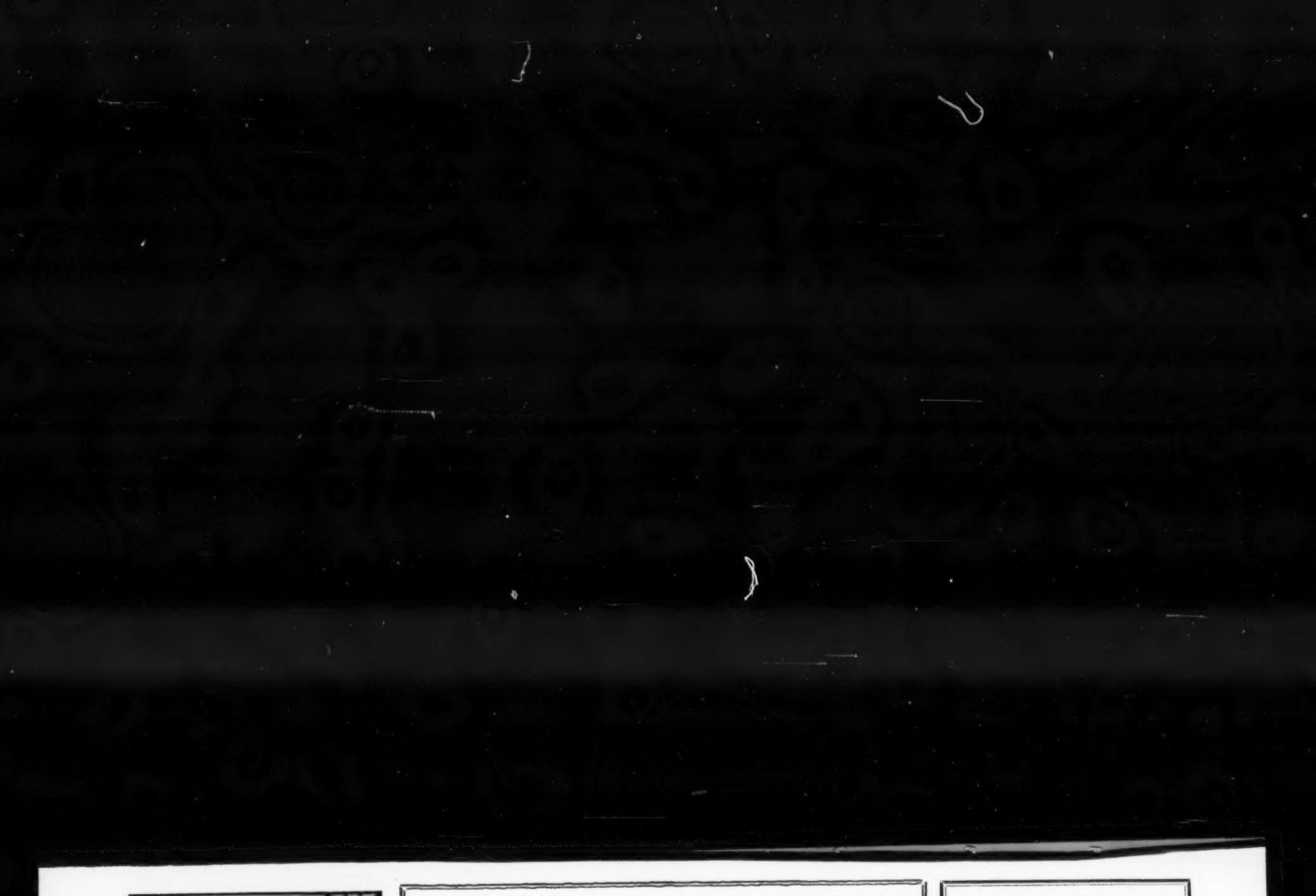
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